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selected abstracts from the NTIS Data File

Fourth Edition—January 1983

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16. Abstract (Limit: 200 words)
This report was created to support the transfer of useful technology to developing countries. An edited search of the NTIS Bibliographic Data Base was performed to locate "Appropriate Technology" reports, including those which could be used by technicians to assist people in developing nations. This report contains approximately 3,000 citations with their abstracts. Appropriate Technology has been broadly defined as information which can be adapted and applied to help solve local development problems of lower income groups. This refers primarily to direct benefits which foster self-reliance. The information covers many fields generally pertaining to one or more of the following categories: Smaller-scale technologies, labor-intensive technologies, low-cost technologies, alternative techniques, useful social and management technologies; and selected modern technologies adapted to local needs and environments. It has been primarily published for use in developing countries for small scale businessmen and industrialists, extension centers, research institutions, farmers, educational institutions, policy planners, and consultants.

This fourth edition supercedes Issue Number Three (PB 81-146052) published in January 1981.

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ABOUT NTIS

The National Technical Information Service (NTIS) is an agency of the U.S. Department of Commerce. It is the central source for the public sale of U.S. Government-sponsored research, development and engineering reports, as well as foreign technical reports and other analyses prepared by national and local government agencies, their contractors or grantees. NTIS is one of the world's leading processors of specialty information.

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Full summaries of current U.S. and foreign research reports and other specialized information, in hundreds of subject categories, are published regularly by NTIS in a wide variety of weekly newsletters, a biweekly journal, an annual index and in various subscription formats for other Federal agencies. The complete texts of the reports cited are sold in paper and microform.

The most timely abstracts are continually grouped by NTIS into paperbound "Published Searches" covering some 2,200 topical subject areas. In addition, customers with a well-defined continuing interest can subscribe to a standing order microfiche service (SRIM) enabling them to automatically receive the full texts of only those documents relating to their individual requirements.

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NTIS is an active worldwide disseminator of technical information. The network which has been developed is now a major clearinghouse for the worldwide flow of technology information appropriate for use within the developing world.

For further information about the program contact the NTIS local organization within your country or write directly to:

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5285 Port Royal Road, Room 309Y
Springfield, Virginia 22161

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

January 1983

Dear Colleague:

The Office of Development Resources in the Bureau for Latin America and the Caribbean, along with the Office of Development Information and Utilization in the Bureau for Science and Technology of the United States Agency for International Development (AID) are proud to collaborate in sponsoring this fourth edition of The Bibliography of Appropriate Technology Information for Developing Countries, produced by the National Technical Information Service (NTIS) of the U.S. Department of Commerce.

This publication is a joint product of two AID projects, each of which were specifically designed to transfer scientific and technological information in developing countries. One project covers Latin America and the Caribbean, the other Africa, Asia, and the Near East.

This edition includes more than 1,000 appropriate technology citations not listed in previous bibliographies. Most are reports recently entered into the NTIS computerized data base. Others are older reports specifically brought to the attention of the NTIS Office of International Affairs by individuals in developing nations who noted their usefulness. All the reports may be purchased directly from NTIS or ordered through the offices of the growing NTIS/USAID international technical information network.

We hope that you will find this volume a useful reference guide, and that the publications listed will contribute to the solving of development problems worldwide.

Sincerely,

Dwight B. Johnson, Director
Office of Development Resources
Bureau for Latin America
and the Caribbean

Lida L. Allen, Director
Office of Development Information
& Utilization
Bureau for Science and Technology

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INTRODUCTION

The National Technical Information Service created the Bibliography of Appropriate Technology Information to support the transfer of useful technology to developing countries. This fourth revision of the bibliography reflects NTIS' continuous efforts to locate reports applicable to the needs of individuals and organizations in that area. The selection of reports was made from the NTIS Data File which now has more than 1.3 million citations.

A broad and general definition of what constitutes an "appropriate technology" was used. The bibliography lists selected scientific and technical information reports which are available from NTIS and which can either be applied or adapted to help solve social development problems around the world. The editors have made a number of revisions to this bibliography, adding numerous new reports and deleting others which were determined to be not as useful as originally anticipated. In addition, the editors revised the subject index to enhance its usefulness for those individuals who only have a broad idea of what type of report is needed to complete a project. A brief description of each major part of the bibliography follows in the section on "How to Use This Bibliography."

The entire question of "what is appropriate technology" continues to be a much debated issue. Many have tried to define it in terms of its attributes, i.e. small-scale, labor intensive, low cost, making maximum use of local skills and resources, etc. Others have pointed out that such definitions are too limiting and a given technology is not appropriate or inappropriate "in-itself" but becomes appropriate only when it is adapted and applied to a local context and environment. Some have stressed the importance of using renewable energy resources and concern for environmental quality, evaluating technologies along these lines. Still others have defined appropriate technology in terms of its contribution to employment, citizen participation and social justice.

Common to all these viewpoints, however, is the belief that science and technology should be appropriate to its local setting and that certain technologies can be inappropriate as the result of incompatibility with social, economic and environmental goals, conditions or values.

The Bibliography was developed to help transfer technology:

- from developed countries to developing countries;
- from developing countries to developing countries;
- within a developing country (there are numerous cases where individuals are not even aware of the work completed or being done in their own countries); and finally,
- from developing countries to developed countries. (There are many organizations in developed countries which work on appropriate technologies. These organizations could further improve upon these technologies for ultimate transfer to developing countries in the form of technical know-how, project assistance, collaboration, etc.)

The major users of this bibliography are expected to be:

- Small Scale Businessmen and Industrialists
- Farmers
- Research Institutes—which can develop and adapt technologies to benefit relevant segments of a given society.
- Extension Centers—which can take appropriate technologies to the remotest areas and poorest people.
- Educational Institutions—which can use some of the documents to upgrade both course content and teaching materials. These institutions may also be involved in pure as well as applied research for transferring technologies into the hands of its end users.
- Policy Planners—who can plan and implement policies at the local, national, and regional levels.
- Consultants—who can develop and adapt the material for commercial exploitation.

The information compiled in this bibliography is broad in scope and generally conforms to one or more of the following eight categories that were developed as criteria for selection. The categories reflect general types of technology which can be used to upgrade the quality of life of low income groups. These eight categories are:

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- **Smaller-Scale Technologies**
  This is exemplified by construction and farm equipment, manufacturing processes and scaled-down industrial plants. Other examples might be a report on a village-level cement plant or information about hand tractors for small farmers.

- **Labor-Intensive Technologies**
  Reports were chosen about devices and processes which generate employment and rely upon available labor and materials instead of scarce capital for startup and operation.

- **Low-Cost Technologies**
  This includes inexpensive and village-level technologies most appropriate for economically marginal groups in both urban and rural areas. Examples include hand pumps, rabbit raising, simple methods of candle manufacturing, etc.

- **Revived Technologies**
  This refers to products and processes once used in the industrialized countries which may still be economically beneficial in developing countries. For example, reports have been included on wind mills, certain machine tools, a variety of plant requirements; and industry profiles.

- **Improved Traditional Technologies**
  One example is giving ox carts of traditional dimensions better tires, wheel bearings, and a suspension system to improve load capacity and durability. Another is basing a fishing cooperative on indigenous management models.

- **Alternative Technologies and Know-How**
  This includes a broad spectrum of information, from proven age-old practices to modern alternative approaches to problem-solving. An example of this would be the *Chinese Barefoot Doctor's Manual*, a handbook featuring acupuncture and traditional herbal remedies as well as modern medical practices.

- **Useful Social and Management Technologies**
  This involves relevant information on health systems, education, cooperatives, small business administration, etc.

- **Selected Modern Technologies**
  An appropriate solution to a problem often requires the most sophisticated technology. An example would be the latest agricultural research used to develop a special disease-resistant strain of rice, solar energy used to power a remote radio station, or program planning methods which can be adapted to a developing country context to meet priority needs.

We hope you find these reports helpful and would appreciate hearing any suggestions about how the bibliography might be improved. Please let us know if you find certain documents especially useful in your development efforts.

S. Dickson Tenney
National Technical
Information Service
Springfield, VA

Bao Jinzhang
Institute of Scientific
& Technical Information of China
Beijing, People's
Republic of China

Prithvi Haldea
Constellate
Consultants
New Delhi, India

HOW TO USE THIS BIBLIOGRAPHY

This bibliography has been prepared to allow a user to search for reports under a descriptive term identifying his need. The user should first review the Subject Index. Each subject listed is followed by the titles and order numbers of the reports containing information on that subject. The user should then refer to the citations which follow in the Appropriate Technology Abstracts. The citations are listed in alpha-numerical order. The Corporate Author Index follows the abstracts should a user need to locate a report prepared by a specific institute.

Several specialized indexes follow for users searching for a specific type of report. They include a listing of Foreign Language Reports in the bibliography as well as a listing of 4-8 page Industry Profiles and lengthier Industrial Plant Reports. The Order Form to request NTIS reports is included as is a specialized document report form which select organizations working directly with the poor in Latin America and the Caribbean may use to order reports free of charge from NTIS.

Should the user have any questions on how to utilize this bibiliography, *please consult your local NTIS cooperating organization listed on the last page of the bibliography. The reports included here are only a select few in the entire NTIS collection;* an additional 70,000 reports are placed into the collection every year. The local organization can help you locate all these reports.

The following briefly describes several of the major sections in more detail:

The **Subject Index** lists all the reports available under 375 specific categories. Should the report deal with various topics it will be listed under each one of the topics. A major revision was made in the subject index in this edition to better reflect the needs of individuals in developing countries. Of particular interest was the reduction in the number of descriptors and identifers from well over 1500 to a more workable total of 300-400 categories most applicable to developing areas. The work was completed by Constellate Consultants, Ltd., the NTIS Cooperating Organization in New Delhi, India.

The **Corporate Author Index** lists the corporations responsible for preparing the reports included in the bibliography. The **Foreign Language Index** lists all the Spanish and French Appropriate Technology reports available from NTIS.

The **Index on Industry Profiles and Industrial Plant Reports** lists the subjects in alphabetical order. The title and accession number of both types of reports are listed. However, abstracts are only available for the industrial plant reports; they are located in the main body of the bibliography. The profiles are four-to-eight page professional analyses prepared for USAID in 1966-67 to promote the development and growth of small industry in developing countries. An example of a profile follows this index. The industrial plant reports contain more descriptive information on many of the same subjects as the profiles.

The **NTIS Document Report Subsidy** is only available for a specialized group of individuals residing in Latin America and the Caribbean. The form describes which specific groups are qualified to request the reports and the document request form is on the back of the same form.

The following is a sample of a typical abstract entry:

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Order/accession number — **This number must be used to order NTIS products**

Corporate author

Keywords—used for indexing and searching

Price codes: PC means paper copy; MF, microfiche. Consult current code-price table for actual prices. It may be located on the instruction sheet immediately following the indexes.

Title of document

Personal Author

Abstract of document

PB-282 480/ **PC A03/MF A01**
World Water Resources, Inc., Bethesda, Md.
Rural Potable Water Chlorination
William E. Hanford, Jr, and Alfred Long 1970, 41p Rept no. WWRI/B-78/1
Sponsored in part by Agency for International Development, Washington, D.C. Office of Science and Technology.

Descriptors: *Rural areas, *Water treatment, *Developing countries, Chlorination, Purification, Maintenance, Gravity drainage, Chlorinators, Performance, Specifications.

Identifiers: Appropriate technology.

The paper addresses two questions: (1) What is the most desirable form of sanitizing chemicals for use in rural water supplies; and (2) What is the best overall means of getting this sanitizing agent into rural water supplies. Several chemicals and hypochlorinators are described and evaluated. In conclusion, a low-cost, dependable feeding device suitable for use in disinfecting marginal waters in the rural areas of developing countries is presented.

ORDERING INFORMATION

Most documents in this publication can be ordered directly from NTIS in both paper copy and microfiche. To order a document, you need to look up the *Order Accession Number* (upper left corner) and the *Price Code* (upper right corner) of each citation in the Appropriate Technology Abstracts. Then follow carefully the ordering instructions which are included, along with the *order form, at the end of this publication.* ***Order by number, not by Title.***

ACCESSION NUMBERS

Most Accession Numbers begin with the letters PB. This is the standard code given to documents entering the NTIS data base. Other publications, however, are assigned a different prefix to help identify the source of the document. Examples are: DOE—Department of Energy; COM—Commerce Department; etc. When ordering a document be sure to use the complete accession number for each publication requested.

PRICE CODES

Price Codes are generally listed as PG A02 and MF A01. This means that paper copy (PC) can be found by looking in the A code price listed below. MF refers to Microfiche and almost always costs $4.50 for those ordering from North America or USAID assisted countries. The price is $9 for other foreign countries. Other price codes are sometimes used.

The following are the price codes most frequently listed in this bibliography. The prices are for 1983 and reflect the cost in North American and USAID assisted countries. Prices in other countries are generally double the price listed here. If the price code is not here, please contact NTIS directly.

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DOE/TIC-11247
Determining Fixed and Operating Costs of Logging Equipment
PB80-202450
Preservative Treatments for Constructional Timber
PB80-227424
Land Biomass Program
PB81-113177
Hardwood Tree Grades for Factory Lumber
PB81-134306
Energy From Biological Processes. Volume II. Technical and Environmental Analyses
PB81-134769
Energy from Biological Processes. Volume III. Appendixes. Part A: Energy from Wood
PB81-134777
Value Loss of Hardwood Lumber during Air-Drying
PB81-138513
A Comparison of Four Techniques for Producing High-Grade Furniture Core Material from Low-Grade Yellow-Poplar
PB81-140532
Fire Safety of Wood-Burning Appliances, Part 1: State of the Art Review and Fire Tests, Volume 1 and Volume 2
PB81-145823
Firewood Crops: Shrub and Tree Species for Energy Production
PB81-150716
Potential for Energy Farming in the Dominican Republic: A Preliminary Analysis
PB81-230559
Marketing Low-Grade Hardwoods for Furnitue Stock--A New Approach
PB81-238966
Harvesting Wood for Energy
PB81-249252
Logging System Cost Analysis: Comparison of Methods Used
PB81-249484
The Socio-Economic Context of Fuelwood Use in Small

Rural Communities
PB82-159070
Silviculture, Management and Utilization of Poplars: Proceedings of a Symposium Held at Srinagar on October 15-18, 1979
PB82-220476
Planing Mill Dressed or Finished Lumber.
PB-175 522/2
A Small Sawmill Enterprise.
PB-175 531/3
Lumber Seasoning.
PB-175 537/0
Rough Sawing of Logs.
PB-175 548/7
Plant Requirements for Manufacture of Plywood.
PB-177 930/5
Wood Species and Glues Influence Plywood Bond Durability.
PB-182 735/1
Balsam Woolly Aphid-Infested Abies Wood as a Source of Pulp Fibre.
PB-182 764/1
A Feasibility Study for a Small LOG Sawmill on the Fort Apache Indian Reservation in Central Arizona.
PB-184 450/5
Pulping of Tropical Hardwoods: Individual and Mixed Species, Wood and Paper Properties, Resource Assessment
PB-221 282/7
Factors Influencing the Utilization of Tropical Wood Species
PB-230 738/7
Development of the Tropical Wood Resource
PB-231 006/8
Physical, Mechanical, and Other Properties of Selected Secondary Species in Surinam, Peru, Columbia, Nigeria, Gabon, Phillippines, and Malaysia
PB-231 894/7
Some Woods of Hawaii...Properties and Uses of 18 Commercial Species
PB-235 801/8
Kiln Drying of Western Canadian Lumber
PB-266 126/2
Leucaena: New Forage and Tree Crop for the Tropics
PB-268 124/5
Les Termites Ravageurs du Batiment (Control of Nonsubterranean Termites and Subterranean Termites)
PB-294 900/6
The Firewood Problem in Africa: Report on the AFR Firewood Conference and Request for Field Views
PB-297 178/6
Wood Pellet Feasibility Study
RHO-CD-829
Interaction of Wood Species in Different Types of Forests
TT-70-57224

WOOD PRESERVATIVES
Preservative Treatments for Protecting Wood Boxes.
AD-686 717/0
Biological Deterioration of Woods in Tropical Environments. Part 3. Chemical Wood Treatments for Long-Term Marine-Borer Protection
AD-736 182/7
Comparison of Wood Preservatives in Stake Tests
AD-740 374/4
Principles for Protecting Wood Buildings from Decay
AD-767 566/3
Preservative Treatments for Constructional Timber
PB80-227424
Removal of Phenolic Compounds from Wood Preserving Wastewaters
PB81-172637
Prolonging Life of Wood in Houses
PB-210 129/3
Wood in Marine Structures. Proceedings of a Seminar Held at Wrightsville Beach, North Carolina on October 7-8, 1977
PB-275 344/0
Taking Care of Wooden Ships
PB-292 590/7
Exploitations Agricoles: Preservation des Poteaux de Cloture et des Bois de Construction (Preservative Treatment of Fence Posts and Farm Timbers)
PB-293 867/8

WOOD PRODUCTS
Individual Log Yields by Eight Sawing Systems
AD-A035 636/0
Rapid Production of Pallet Deckboards from Low-Grade Logs
AD-724 272/0
Wood Pallet Manufacturing
AD-738 268/4
Manualidades (Handmade Crafts)
PB80-175078
Technology Utilization in Rural Development
PB81-204174
Marketing Low-Grade Hardwoods for Furniture Stock--A New Approach
PB81-238966
International Directory of Documentation Services Concerning Forestry and Forest Products
PB81-246056
Hard Boards
PB82-108929
Timber and Timber Products in Structural Uses
PB82-209149
Plant Requirements for Manufacture of Wood Tables and Chairs.
PB-177 925/5
Plant Requirements for Manufacture of Flush Doors.
PB-177 929/7
Report on Survey Team Projected AID Research Program on Improved Forest Products Utilization in Latin America
PB-208 802/1
Utilization of Bark Waste
PB-221 876/6
Black Walnut as a Crop. Black Walnut Symposium, Carbondale, Illinois, August 14-15, 1973
PB-223 510/9
Some Woods of Hawaii...Properties and Uses of 18 Commercial Species
PB-235 801/8
How Craftsmen and Home Hobbyists Can Make and Use Wood Plastic Composite Materials
PB-242 973/8
Manual Talla de Madera (Wood Carving Manual)
PB-278 507/1
Sash and Door Plant; A Reference for use in Planning New Industrial Facilities
PB-292 784/6
Plant Requirements for Manufacture of Boxes and Shooks
PB-292 922/2
Woodworking in Estonia: Historical Survey.
TT-68-50342

WOOD STOVES
Environmental and Health Aspects of Biomass Energy Systems
CONF-800814-11
Small-Scale Energy-Technology Projects in the Pacific Territories: A Case-Study Review
DE82001338
Cameroon Renewable Energy: Project Possibilities
PB81-145658
The New Nepali Chulo: Fuel Efficient and Smokeless Cooking Stoves
PB82-218819
Natural Energy and Living, Number 3, 1978
PB-290 420/9

WOOD WASTES
Particleboards from Lower Grade Hardwoods
AD-A044 578/3
Conversion of Cellulosic Wastes to Liquid Fuels
COO-2982-57
Conversion of Wood Residues to Diesel Fuel
COO-2982-67
Alcohol Production from Agricultural and Forestry Residues
DOE/EV-0108
An Evaluation of Wood-Waste Energy Conversion Systems.
N79-10528/4
Energy from Biomass: The Simplex Process for the Gasification of Coal and Forest Pulp
PB81-110512
Wood Wastes.
PB-175 550/3
Utilization of Bark Waste
PB-221 876/6
Fuel and Energy Production by Bioconversion of Waste Materials - State-of-the-Art
PB-258 499/3
Clean Fuels from Agricultural and Forestry Wastes
PB-259 958/1
Chemicals from Wood Waste
PB-262 489/8
Pyrolytic Conversion of Agricultural and Forestry Wastes in Ghana - A Feasibility Study
PB-271 392/3
Pyrolytic Conversion of Agricultural and Forestry Wastes to Alternate Energy Sources in Indonesia; a Feasibility Study
PB-275 569/2
A Study of the Feasibility of Utilizing Solid Wastes for Building Materials. Phase III and IV Summary Reports
PB-285 437/0
Wood Pellet Feasibility Study
RHO-CD-829
Efficient Burning of Wood Waste
SVF-57

WOODEN STRUCTURES
FPL (Forest Products Laboratory) Designs Meet Family Housing Needs
AD-744 691/7
Strength of Timber Roof Connections Subjected to Cyclic Loads
PB81-139222
The Kenyan Low Cost Modular Timber Bridge
PB81-214595
Research Report on Nail-Joints in Timber Structures. Part III
PB82-108960
Timber and Timber Products in Structural Uses
PB82-209149
Wood in the Construction of Mass-Produced Houses
PB-207 812/9
Low-Cost Wood Homes for Rural America - Construction Manual
PB-211 640/8
Wood in Marine Structures. Proceedings of a Seminar Held at Wrightsville Beach, North Carolina on October 7-8, 1977
PB-275 344/0

WOODWORKING
Survey of the Market for Sawmilling and Woodworking Equipment in Singapore
DIB-76-02-503
Plywood Processing and Woodworkig Equipment Study in Taiwan R. O. C
DIB-77-10-514
Problems in the Construction of Woodworking Machines
N72-26508/3
Les Petites Scieries (A Small Sawmill Enterprise)
PB80-148927
Woodworking. Circular-Saw Accidents
PB-227 591/5
Health and Safety Guide for Plywood and Veneer Mills
PB-274 759/0
Manual Talla de Madera (Wood Carving Manual)
PB-278 507/1
Health and Safety Guide for Sawmills and Planing Mills
PB-278 033/8
Equipment for Rural Workshops
PB-297 379/0
Woodworking in Estonia: Historical Survey.
TT-68-50342

YARNS
Appropriate Technology for Cotton Yarn Spinning on Cottage Basis in Rural Areas
PB80-125701
Plant Requirements for Manufacture of Worsted Yarns.
PB-177 927/1
Plant Requirements for Manufacture of Crochet and Knitting Yarns
PB-292 675/6
Plant Requirements for Manufacture of Jute Yarn
PB-292 958/8
Plant Requirements for Manufacture of Woolen Yarn
PB-293 004/0
The Structure of Yarn
TT-73-54014

YUGOSLAVIA
Reservoirs and Dams
PB-282 233-T
Norms and Tables for Animal Nutrition
TT-68-50103

ZAIRE
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XIV: Zaire
PB80-145246
Environmental Profile of the Republic of Zaire, Phase I
PB82-129230

ZAMBIA
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Choice and Adaptation of Appropriate Technology in Promoting Health-Care in Zambia
PB80-157001
Directory of Scientific Organisations in Zambia
PB82-113572
The Effect of Form and Orientation on the Radiant Solar Heat Load on Buildings under Zambian Conditions
PB82-113580
An Investigation of the Properties of Rural and Urban Bricks
PB82-113871
Upgrading in Lusaka: Participation and Physical Changes
PB82-181050
A Deflection Survey Technique for Pavement Evaluation in Developing Countries
PB-218 338/2
Rural Africa Development Project: A Survey Technique for Identifying the Needs of Small Farmers, and an Example of Its Use in Zambia
PB-297 785/6

ZINC
Battery
PB81-120263
Seminar on Zinc Wastes and Their Utilization Technical Papers Held at New Delhi, India on October 15 and 16, 1980
PB81-120289
Lead and Zinc in Developing Countries: Problems and Prospects. A Report on the Mini Seminar Held at New Delhi, India on October 3, 1978
PB81-122491

AD-A003 909/9 PC E02/MF A01
Naval Research Lab., Washington, DC.
Corrosion of Metals in Tropical Environments: Part 10 - Final Report of Sixteen-Year Exposures
Final rept.
C. R. Southwell, and J. D. Bultman. 2 Jan 75, 41
Rept no. NRL-7834
See also Part 9, AD-687 705.

Keywords: *Corrosion, Tropical tests, Sea water, Fresh water, Tables(Data).

A comprehensive long-term investigation of corrosion of 52 metals immersed in seawater and in fresh water, suspended at mean-tide level, and exposed to marine and inland tropical atmospheres has been completed for exposure periods of up to 16 years. A series of reports on specific metal groups has already been published. This is a final report on the project; it presents tabulated results for all metal-environment combinations included in the study, both for simple plates and bimetallic couples. Many of these are previously unreported data. Time-corrosion curves for all single-metal exposures not previously reported on to completion are included; these are for 16 wrought and cast ferrous metals in two atmospheres and 7 nonferrous metals in all five environments. Because of their basic value for comparing corrosiveness of environments and for evaluating effectiveness of alloys, curves for all the commercially pure metals are presented for all five environments. The final steady-state corrosion rate is a most useful value for estimating expected metal life; this value (R sub c) has been established for most metals in each environment and is included with all curves and tabulated data.

AD-A004 254/9 PC A05/MF A01
Naval Postgraduate School, Monterey, CA.
Factors Effecting the Fatigue Strength of Ferro-Cement
Master's thesis
David P. Sargent, Jr. Dec 74, 89p

Keywords: *Reinforced concrete, Fatigue(Mechanics), Wire, Orientation(Direction), Impregnation, Cements, Fatigue tests(Mechanics), Stresses, Theses, *Concrete, *Ferrocement.

Ferro-cement is a composite material consisting of multiple layers of wire mesh impregnated with a cement mortar. Steel rods may be sandwiched in the center to give added strength, and to shape the mesh before application of the mortar. Selection of materials can vary considerably. Investigation of the influence of wire orientation on the fatigue strength of ferro-cement was undertaken in this study. Tests were also conducted to determine the effect on fatigue life of voids in the specimens caused by poor penetration of the mortar.

AD-A007 918/6 PC A02/MF A01
Forest Products Lab., Madison, WI.
Recovery and Reuse of Wastepaper from Shredded Household Trash
Forest Service research paper
James F. Laundrie. 1975, 14p Rept no. FSRP-FPL-252

Keywords: Waste disposal, Reclamation. *Paper, Separation, Thermoplastic resins, Films, *Waste recycling, Waste papers, Refuse disposal, Recycled paper, Shredding, Classifiers, Sorting.

The report describes the research and development of the dry process originated at the Forest Products Laboratory for separating wastepapor from shredded household trash. The process, based on air classification, provides for removal of thermoplastic films. It also permits separation of the wastepaper by grade. Indications are that the recovered paper can be used successfully in a variety of products.

AD-A007 954/1 PC$3.75/MF$3.00
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
The Use of Microfiches for Scientific and Technical Reports: Considerations for the Small User
B. J. S. Williams, and R. N. Broadhurst. Oct 74, 27p
Rept no. AGARD-ograph-198
NATO furnished.

Keywords: Microfiche, Reports, User needs, Costs, Film readers, *Information services.

The report is intended primarily for the small user concerned with the use of microfiches for scientific and technical report material. In the context of the report the small user is considered to be the individual engineer or project worker or, at most, the small company, department or project team handling microfiches on a modest scale. While emphasis has been placed on the use of microfiches - their reading, duplication, print out and storage - some general information has also been included on the production of microfiches. The report has been confined to the type of microfiche containing 60 or 98 frames (now referred to as 'medium reduction microfiches') used for the reproduction of individual reports. Medium reduction microfiches are also widely used for reproducing journals and periodicals on an issue-by-issue basis, for individual articles, monographs or papers and, less exclusively, for parts lists and maintenance manuals. Parts of the report will, therefore, be found broadly relevant to these other applications.

AD-A008 453/3 PC A04/MF A01
Asian Inst. of Tech., Bangkok (Thailand).
The Reclamation of Drinking Water from Sewage
Annual rept. 1 Jan-31 Dec 72
M. G. McGarry. 4 Feb 75, 74p ARDG(FE)-472-2
Grant DA-RDRF-S92-544-72-G181

Keywords: *Water treatment, Drinking water, Water reclamation, Waste water, Arid land, Nitrogen, Algae, Photosynthesis, Activated carbon, Filtration, Thailand, *Waste water reuse, Potable water, Chemical removal(Water treatment), Harvesting of algae, Aeration ponds, Lagoons(Ponds), Activated carbon treatment, Water pollution control.

Indirect reuse of wastewaters in drinking water supplies is common practice in industrialized states today. The investigations reported upon have been directed towards improvements upon existing techniques more applicable to the tropical and savanna developing country. High costs and technical difficulties have been encountered in the removal of nitrogen and low level organics. In this study, investigations have been conducted into nitrogen stripping by photosynthetic algal growth, using the nitrogen as a nutrient with subsequent algae harvest from ponds, and low level organics reduction by (a) powdered activated carbon treatment and (b) semi-rapid filtration. Several processes including high rate treatment oxidation ponds, dissolved air flotation, roughing filtration, photosynthetic nitrogen stripping ponds, powdered activated carbon adsorption, dual-media filtration and chlorination were developed and specifically applied to domestic wastewater reclamation for drinking water. These were incorporated into two process streams, one using activated carbon for low level organics removal and the other semi-rapid filtration.

AD-A009 306/2 PC A07/MF A01
RAND Corp., Santa Monica, CA.
Analyzing the Use of Technology to Upgrade Education in a Developing Country
Research memo.
Margaret B. Carpenter, L. G. Chesler, H. S. Dordick, and Sue A. Haggart. Mar 70, 147p Rept no. RM-6179-RC

Keywords: Teaching methods, Instructional materials, Technology, Schools, *Education, Television systems, Cost analysis, Instructors, Colombia, Developing countries.

The memorandum describes an application of the techniques of system analysis to educational planning. Particular emphasis is placed on evaluating the usefulness of technology in education, especially television. In contrast to most analyses of educational technology, the present study (1) considers the technology as it interrelates with the entire educational system in which it is to function, and (2) proposes alternative means to attain similar improvements in that system. By comparing the cost of alternative ways to attain similar improvements, the study shows that the cost of technological improvements is approximately the same as that of improvements achieved through more conventional means.

AD-A010 390/3 PC A03/MF A01
Pet Inc Greenville Ill Contech Labs
Investigative Study of the Development of a Dry Whole Milk Substitute for Ration Use
Final rept.
Donald C. Zimpfer. Dec 74, 39p FEL-25
Contract DAAG17-73-C-0119

Keywords: *Milk, Dehydrated foods, Rations, Storage, Substitutes, *Food processing, Vegetable oils, Flavor, Beverages, Evaluation, Food additives.

A dry whole milk substitute for ration use was developed. This investigative study involved the selection and evaluation of formulation variations, processing parameters, and instantizing conditions as they affect the physical and flavor characteristics of the product. The historic problems of a chalky mouth sensation and very limited shelf life were overcome. Chemical, physical and organoleptic methods were used to evaluate product quality. A specific formulation and process are proposed.

AD-A010 976/9 PC A03/MF A01
RAND Corp., Santa Monica, CA.
A Housing Services Policy for Low-Income Urban Families in Underdeveloped Countries
Georges Vernez. Dec 74, 26p Rept no. P-5328

Keywords: Underdeveloped areas, Nations, Marketing, Policies, Construction, Urban areas, Finance, Management planning and control, Classification, *Housing, Developing countries, Squatter communities, Services, Low income families.

Housing policies for urban low-income families in underdeveloped countries have typically stressed the public supply of fully serviced standard housing units, but these policies are mostly unsuccessful. In practice, a large proportion of the demand for shelter has been overflowing into so-called squatter settlements that are developing at the periphery of most large sized cities of the emerging nations. The paper discusses a housing services policy which promises to be effective for these families. The financial component of the policy is studied.

AD-A013 482/5 PC A05/MF A01
Naval Postgraduate School, Monterey, CA.
The Effects of Precycling on the Strength of Ferro-cement
Master's thesis
Earle Stanley Babcock. Jun 75, 90p

Keywords: *Reinforced concrete, Fatigue(Mechanics), Fatigue tests(Mechanics), Wire, Stresses, Cyclic tests, Tensile properties, Bending stress, Theses, *Concrete, *Ferrocement.

Ferrocement is a composite material made up of cement mortar reinforced with a mesh of steel wire. Its non-homogeneity results in material characteristics which are peculiarly its own. In this study, the ferrocement specimens tested varied in the type of wire reinforcement used, as well as in the water content of the mortar. Stress versus cycles to failure curves were developed, and comparisons were made between the curves of different types of specimens. Bending and tensile strength tests were conducted after cyclic loading in order to gain insights on the effects of precycling. Finally, some comparisons were made which related the data from this thesis to that of several preceding studies.

AD-A015 426/0 PC A08/MF A01
Army Tropic Test Center, APO Miami 34004.
Materiel Testing in the Tropics
4th ed.
Jun 75, 167p Rept no. USATTC-7503001

Keywords: Environmental tests, Tropical regions, *Materiel, Handbooks, Degradation, Climate, Computerized simulation, Geology, Vegetation, Biodeterioration, Herbicides, Elastomers, Plastics, Textiles, Electronic equipment, Optical equipment, Leather, Acoustics, Human factors engineering, Seismology, Radio transmission, Ground vehicles, Panama, Canal zone.

The US Army Tropic Test Center (USATTC), presents the 1975 update of Tropic Environmental Effects, retitled Materiel Testing in the Tropics. The handbook is a compendium of the US Army's experience in testing equipment in the humid tropics. Sources of information are tropic materiel tests, test methodology investigations, personal experiences, open literature, Department of Defense reports, and voluntary contributions from many scientists and engineers outside of

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USATTC. The document is the US Army's unofficial corporate memory of tropic materiel testing. Topics covered include the Panama Canal Zone environment, history of tropic tests, degrading environmental factors, materiel degradation, tropic reliability and maintainability, vehicular mobility testing, sound, visibility, and radio propagation, human factors engineering, working in the jungle, man-pack protability and computerized test site selection methods.

AD-A018 147/1 PC E02/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Protection of Slopes Against Rainfall Erosion
Final rept. Jul 74-Jun 75
Edward B. Perry. Sep 75, 41

Keywords: *Soil erosion, Rainfall, Slopes, Construction, Soil mechanics, Simulators, Soil stabilization, Runoff, Test methods, Protection, Effectiveness, Sprays, Slope stability.

Commercially available spray-on stabilizers are represented as being capable of controlling soil erosion between the time of slope construction and establishment of a vegetative cover. This study presents a review of previous research on rainfall erosion process, mechanics of rainfall erosion, characteristics of natural rainfall, rainfall simulators, studies of rainfall erosion of soils and studies of rainfall erosion of laboratory rainfall simulator.

AD-A018 695/7 PC$6.00/MF$3.00
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Piping in Earth Dams Constructed of Dispersive Clay; Literature Review and Design of Laboratory Tests
Final rept.
Edward B. Perry. Nov 75, 131p Rept no. WES-TR-S-75-15

Keywords: *Dams, Earth fills, Seepage, Clay, Leakage(Fluid), Soil erosion, Test facilities, Earth dams, Dispersive clays, Piping(Erosion).

It was assumed when empirical piping criteria were developed 25 yr ago that soil type and method of construction were the main parameters controlling the resistance of homogeneous earth dams to piping failure. Research on piping failure in earth dams constructed of dispersive clay (a particular type of soil in which the clay fraction erodes in the presence of water by a process of deflocculation) was initiated in Australia about 15 yr ago. This research has resulted in a method of analysis to assess the susceptibility of a homogeneous earth dam, constructed of predominately illite or montmorillonite clay, to dispersive clay piping. The first study of dispersive clay in the United States, reported in 1972, developed a relationship between percent sodium and total soluble salts in the soil pore water extract and field performance of earth dams as evidenced by piping failure or rainfall erosion damage. This research has demonstrated the usefulness of the pinhole erosion test as a method of identifying dispersive clays, shown the feasibility of using filters to prevent piping in dispersive clays, and indicated that stabilization of dispersive clays is possible.

AD-A019 542/0 PC A07/MF A01
Wisconsin Univ.-Madison. Dept. of Veterinary Science.
Association of Vertebrate Pathogens with Ecological Perturbation of Tropical Forests. Part I
Final rept.
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 144p AFOSR-TR-75-1644
Grant AF-AFOSR-2337-72
See also Part 2, AD-A019 543.

Keywords: Pathogenic microorganisms, Virus diseases, Veterinary medicine, Tropical diseases, Ecology, Infectious diseases, Disease vectors, Arthropod borne diseases, Insects, Forests, Viruses, Domestic animals, Vertebrates, Viruses, Wildlife, Serology, Isolation, Laboratory tests, Colombia, South America, *Diseases, *Animal diseases, Ecosystems.

The study associates arthropod-borne viral diseases with ecologically diverse areas of Colombia, South America. The objective was to determine if domesticated animals, and to a limited lesser extent man, resident in the coastal plain, mountain valleys and highlands had been infected with certain insect-borne viruses. A record intensive study was carried out in an area of ecological transition to determine if the changes in bird, mammal biting insect populations and their associated viruses could be detected in primary and secondary forests and nearby croplands and pastures over a two-year period. Microbiological data are presented and discussed.

AD-A019 543/8 PC A10/MF A0
Wisconsin Univ.-Madison. Dept. of Veterinary Science.
Entomological Studies. Part II
Final rept.
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 213p AFOSR-TR-75-1645
Grant AF-AFOSR-2337-72
See also Part 3, AD-A019 544.

Keywords: Entomology, *Insects, Ecology, Diptera, Tropical regions, Disease vectors, Arthropod borne diseases, Domestic animals, Humans, Forests, Colombia, South America, Culicoides, Culicidae, *Diseases, Hematophagous insects, Ecosystems, Phlebotomidae, Tabanidae, Simuliidae.

The entomological studies reported in this volume represent an effort to document environmental changes, such as habitat availability, host availability and climate, as they relate to the abundance and distribution of hematophagous Diptera. Some studies were conducted in primary and secondary forests and associated clearings which are areas of early ecological disturbance. Other studies were performed in an area of great ecological disturbance. The data show that the ecological changes have altered populations of biting insects and influence the potential and actual risk of transmission of arthropod-borne pathogens of man and domesticated animals.

AD-A019 544/6 PC A11/MF A01
Wisconsin Univ.-Madison. Dept. of Veterinary Science.
Mammalogical, Ornithological and Plant Ecology Studies. Part III
Final rept.
Robert P. Hanson, and Thomas M. Yuill. Oct 74, 236p AFOSR-TR-75-1646
Grant AF-AFOSR-2337-72
See also Part 2, AD-A019 543.

Keywords: Ecology, Disease vectors, Wildlife, Tropical regions, Forests, Mammals, Birds, Plants(Botany), Vertebrates, Invertebrates, Pathogenic microorganisms, Colombia, South America, *Animal diseases, Ecosystems.

Disease causing agents are as real a part of tropical ecosystems as are the more conspicuous vertebrate, invertebrate and plant members. Tropical ecosystems are complex and man-induced modification may lead to increased disease prevalence. Prediction of disease problems related to ecological perturbation rests on understanding the composition and function of the ecosystem. Changes in populations of wild vertebrate reservoirs and insect vectors are the key to changes in disease incidence. The studies presented in this section represent an effort to describe the bird and mammal communities found in primary and secondary forests and associated agricultural clearings. Important information about the occurrence of certain pathogenic agents was also obtained.

AD-A020 543/5 PC A03/MF A01
Air Force Human Resources Lab., Brooks AFB, TX.
Techniques for Generating Instructional Slides
Final rept. May 74-Jul 75
Edgar A. Smith, Paul W. Hall, and James B. Manson. Nov 75, 28p Rept no. AFHRL-TR-75-68

Keywords: Air Force training, Audiovisual aids, Instructional materials, Display systems, Projection, Photographic images, Preparation, Plates, Production engineering, *Education, *Training, Projector slides.

The visuals used in carrels in learning centers are normally produced in one of three ways. They may be photographs of objects or procedures. They may be drawings rendered by a graphics specialist. The third type, and the one of particular relevance in this report, are the images that can be prepared on a typewriter. These would be questions, verbal instructions, outlines, key points, or any other content that can be prepared by typing. While this type of slide is common in briefings, the large volume of them required in individualized instruction warrants spending considerable time and effort in developing an efficient and effective method of producing them rapidly yet with acceptable quality.

AD-A021 862/8 PC A05/MF A01
Civil Engineering Lab. (Navy), Port Hueneme, CA.
Solar Heating of Buildings and Domestic Hot Water
Final rept. Jul 74-Dec 75
E. J. Beck, Jr, and R. L. Field. Jan 76, 89p Rept no. CEL-TR-835

Keywords: Solar heating, *Solar collectors, Water, Space heaters, Hot water, *Buildings, Solar radiation, Solar energy, Energy storage, Energy conservation, Cost analysis, Naval research, *Solar heating systems, *Solar water heating, Insolation.

The purpose of this document is to provide guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices, and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. The calculation procedure is based on parametric curves for 'fraction of heating load supplied by solar energy 'and several' rules of thumb' for design. A series of 11 worksheets is used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling, and the other DHW supply for a dispensary. Neither was found to be cost effective when competing against present day prices for natural gas. A directory of manufacturers and bibliography is also included. (Author)

AD-A025 397/1 PC A07/MF A01
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Role of Communication Satellites in Education for Less-Developed Countries
Master's thesis
David Earl Hughes. Oct 75, 133p Rept no. AFIT-CI-76-29

Keywords: Communication satellites, *Education, Developing nations, Television systems, Nations, Mass media, Television receivers, Satellite communications, India, Theses, *Television, Intelsat satellites.

The purpose of the study is to place the potentials and problems associated with communication satellites and educational television into perspective with the social, political, and economic resistance which often hinder the utilization of technological advancements. The study examines the need for an educational broadcasting satellite system in detail.

AD-A026 041/4 PC A02/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
Method for Estimating Solar Heating and Cooling System Performance
Douglas C. Hittle, George N. Walton, and Donald F. Holshouser. 1976, 14p

Keywords: Solar heating, Solar energy, Air conditioning equipment, Buildings, Geographical distribution, Solar radiation, Computerized simulation, Climate, *Solar cooling systems, *Solar heating systems.

During FY75 the Construction Engineering Research Laboratory, under funding from the Office of the Chief of Engineers, engaged in a research effort to develop a method for the preliminary determination of the feasibility of heating and cooling buildings with solar energy. The principle objective of the work effort was to provide a simple means for estimating the expected performance of a given solar heating and cooling system when applied to typical buildings in various regions of the Country.

AD-A026 264/2 PC A08/MF A01
Air Force Inst. of Tech., Wright-Patterson AFB, OH.

Solid Waste Management - Tomorrow's Alternatives in the Urban-Rural Environment
Master's thesis
Ronald J. Weeden. 1975, 161p Rept no. AFIT-CI-76-44

Keywords: *Waste disposal, Management planning and control, Regulations, Legislation, Materials recovery, Economic analysis, Collecting methods, Shredding, Incinerators, Fuels, Packaging, Theses, Solid waste disposal, *Waste recycling, Waste transfer stations, Sanitary landfills, Composts.

Solid wastes collection and disposal problems are enormous and inadequacies are not only polluting our land, air, and water, but are precipitating social, economic, and political problems as well. It is assumed that any design for solid waste management must include resource recovery as an integral part of the system, but only within the limits of cost/benefit advantages and, equally important, within the limits of developing markets for recovered materials. Viable alternatives are documented for solving the immediate problem and integrating the capability for conserving precious resources by enhancing the following objectives: (1) Improve efficiencies; (2) Enhance satisfaction; (3) Increase local knowledge and information; and, (4) Economically recover and process materials.

AD-A028 083/4 PC A02/MF A01
Ballistic Research Labs., Aberdeen Proving Ground, MD.
Solar Energy Storage
Arthur Gauss, Jr. Jun 76, 24p Rept no. BRL-1895

Keywords: *Solar energy, Low temperature, Reversible, Chemical reactions, *Solar collectors, *Solar heating systems, Endothermic reactions, Flat plate models, Heat of vaporization, Heat pumps, Heat storage, Solar space heating.

Low temperature processes for solar energy storage have been evaluated. Temperatures are low enough so that relatively inexpensive flat plate solar collectors can be employed. Low temperature reactions are proposed which demonstrate the principles of chemical storage of solar energy. Certain of these reactions could be laboratory tested with little difficulty since they yield products which separate naturally. The most practical low temperature system analyzed to date is the heat of vaporization storage system. The storage capacity for this system, typically about 200 kcal/liter, is close to an order to magnitude better than conventional sensible heat storage in water. (Author)

AD-A029 053/6 PC A07/MF A01
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Food Science.
Procedures to Minimize Mechanical Damage to Freeze-Dried Foods
Final rept. 15 Aug 73-14 Apr 75
Shri C. Sharma, and Edward Seltzer. Mar 75, 128p FEL-20
Contract DAAK03-73-C-0013

Keywords: Freeze dried foods, Meat, *Food processing, Damage, Packaging, Formulations, *Food storage, Polymeric films, Phosphates, Proteins, Mechanical properties, Additives, Moisture content, Storage, Stability, Binders.

The objective of the studies reported herein was to develop procedures principally to minimize mechanical breakage during handling and transport, while retaining or improving other quality characteristics of ten meat/seafood products. The effects of freezing rate prior to freeze drying, dehydration parameters, and various food grade additives were evaluated. Formulations have been developed which result in the products which are mechanically stable and exhibit superior texture, rehydration and organoleptic qualities. The major advance discovered in this study has been the effectiveness of salt soluble meat proteins, dispersed by an optional incorporation of phosphates, as binder for the meat tissues, in a process sequence which includes lyophilization. The phosphate treatment is part of the additive system, the effectiveness of which is augmented by sodium chloride and in some cases by wheat gluten and meat emulsion.

AD-A029 258/1 PC A08/MF A01
Naval Research Lab., Washington, DC.
Proceedings of a Workshop on the Biodeterioration of Tropical Woods: Chemical Basis for Natural Resistance Held at Naval Research Laboratory, Washington, D.C. on October 17-18, 1974
John D. Bultman. Jul 76, 102p

Keywords: *Wood, Biodeterioration, Tropical regions, Meetings, Resistance(Biology), Chemical reactions, Biocides, *Marine borers, Fungicides, Inhibition, Oxidation, Melanin, Response(Biology), Termites, Mollusca, Phenols, Polycyclic compounds, Cooling towers, Quinones.

Contents:
- Research at the Naval Research Laboratory on Bioresistant tropical woods:
- An Overview;
- Biocides from Marine borer resistant timbers;
- Dalbergia polyphenols and shell formation in mollusks:
- Preliminary results;
- Search for a 'Weak Link';
- The performance of Dalbergia wood and Dolbergia Extractives impregnated into pine and exposed in a water cooling tower;
- Inhibition of fungal growth and reproduction by obtusaquinone and some cinnamylphenols;
- Resistance of tropical woods to subterranean termites;
- Responses of the Formosan Subterranean Termite to tropical wood extracts;
- Field evaluation of natural wood extractives and some related compounds as antiborer agents;
- Comments on Melanin and polyphenoloxidase inhibitors.

AD-A029 823/2 PC A02/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Research and Development of Fiber-Reinforced Concrete in North America
Final rept.
George C. Hoff. Feb 74, 19p Rept no. WES-MP-C-74-3
Presented at Symposium on Concrete Research and Development (1970-1973) Sep 73, Sydney, Australia.

Keywords: *Reinforced concrete, *Concrete, Fiber reinforcement, Reinforcing materials, Steel, Glass, Plastics, Fibers, Spallation, Impact strength, Flexural properties, Metal fibers, Glass fibers, Glass textiles, Mortars(Material), *Ferrocement.

Fiber-reinforced concrete (FRC) in North America is emerging from the laboratory and is finding many potential applications. Steel, glass, and plastic fibers are being used in mortars and concretes to improve the characteristics of these materials, particularly the flexural and impact strengths. Steel-FRC is being used mostly for pavement overlays. Glass-fiber-reinforced cements are being used in architectural products. Plastic-fiber-reinforced products are being used for improved spall and impact resistance. The applications of FRC are limited only by the ingenuity of the user. (Author)

AD-A029 842/2 PC A02/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Bamboo Reinforced Concrete
Miscellaneous paper
Helmuth G. Gevmayer, and Frank B. Cox. Jan 70, 19p Rept no. WES-MP-C-70-2
See also Rept. no. AEWES-TR-C-69-C-1 dated Feb 69, AD-685 824.

Keywords: *Concrete, *Reinforced concrete, Reinforcing materials, Fiber reinforcement, Bonding, Deformation, Shrinkage, Flexural strength, Cracking(Fracturing), Deflection, Strength(Mechanics), *Bamboo reinforced concrete.

Military construction activities in Southeast Asia have caused renewed interest in bamboo reinforcement and an investigation of the use of bamboo as expedient reinforcement for concrete was begun at the U. S. Army Engineer Waterways Experiment Station. The more important results and conclusions are summarized here.

AD-A032 835/1 PC A06/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Expedient Reinforcement for Concrete for Use in Southeast Asia. Report 3. Additional Tests of Bamboo
Frank B. Cox, and James F. McDonald. Dec 70, 101p Rept no. WES-TR-C-69-3-3
See also Report 2, AD-706 646.

Keywords: *Reinforced concrete, Reinforcing materials, Plants(Botany), Preparation, Loads(Forces), *Bamboo reinforced concrete, *Concrete, Bamboo.

This report summarizes the to-date (October 1969) results of a current WES study on the feasibility of using bamboo as an expedient reinforcement for temporary reinforced concrete structures. The report contains the results of an investigation of the most important engineering properties of an Asian species of bamboo (Phyllostachys bambusoides or Madake), some additional properties (since the publication of Report 1) obtained for the local Mississippi cane (Arundinaria tecta), description of short-time static tests conducted on 14 beams, description of tests of two beams subjected to sustained loading, conclusions, and tentative, to-date recommendations for the design of bamboo-reinforced members.

AD-A032 970/6 PC A03/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Water Hyacinth Research in Puerto Rico
Final rept.
William N. Rushing. Sep 73, 33p Rept no. WES-MP-M-73-13

Keywords: *Water hyacinth, *Weed control, *Puerto Rico, Biological control, Productivity, *Aquatic weeds, Snails, Food consumption, Electric power plants, Pumping, Lakes, Reservoirs, *Aquatic plant control, Pomacea australis, Eichhornia crassipes.

Water hyacinths are by far the most troublesome aquatic weeds in Puerto Rico. In 1972 the Tropical Terrain Research Detachment of the U. S. Army Engineer Waterways Experiment Station conducted a limited study on the productivity of water hyacinths in field situations and on the biological control of some native aquatics with the Brazilian snail, Pomacea australis. This paper presents some quantitative data on water hyacinth productivity in three different natural locations on the island. Data are also given on amounts and rates of consumption of aquatics by the snail, whose use as an agent for biological control of aquatic weeds appears promising.

AD-A034 871/4 PC A03/MF A01
Office of Naval Research, London (England).
International Symposium on Wind Energy Systems, Held at Cambridge Univ., 7-9 Sep 76
Conference rept.
Robert H. Nunn. 7 Dec 76, 28p Rept no. ONRL-C-31-76

Keywords: Energy conversion turbines, Axes, Orientation(Direction), Configurations, Efficiency, Augmentation, *Wind energy, Economic analysis, Fabrication, State of the art, Forecasting, Symposia, Planning, Great Britain, Windmills, Wind turbines, Vertical axis turbines, Horizontal axis turbines, Wind power generation, Meetings.

Vertical - and horizontal-axis systems were discussed both in theory and in practice. Applications ranged from wind forms each with hundreds of megawatt units to the use of Cretan windmills to provide water for cattle. Wing energy conversion units have been operated in several configurations and the theory of their performances is sufficiently advanced to allow design for fabrication. The trends are towards larger units for municipal power systems and smaller units for domestic use. In the former case, the behavior of large wind turbines operating in large arrays, and the output (with and without storage) of several such arrays when geographically dispersed, has yet to be well understood. The field has reached a level of maturity characterized by such factors as economics, environmental impact, and public acceptance.

AD-A035 615/4 PC A02/MF A01
Forest Products Lab., Madison, WI.
Is There a 'Best' Sawing Method
Forest Service research paper

Hiram Hallock, Abigail R. Stern, and David W. Lewis. 1976, 14p Rept no. FSRP-FPL-280

Keywords: Lumber, *Wood, Yield, Sizes(Dimensions), Diameters, Shrinkage, Length, Patterns, Computer applications, Tables(Data), *Sawmills, *Industrial plants, Sawing, Wooden logs, Saw mills, BOF computer program.

The Best Opening Face (BOF) computer sawing program has been used to investigate the relationship, in terms of lumber yield, of log diameter (5 to 20 in.), log length (8 to 24 ft.), and taper (1 to 5 in.) to eight of the most commonly used sawing methods. Results generally show that logs 16 feet or shorter and with 3 inches or less of taper, yield best when sawn by one sawing method, and those longer and with more taper by another method. Results of this research can form the basis for making rational selection of sawing systems in new mills when the log mix to be processed is known. As examples of the potential of this information in management decisions, three actual sawmill log mixes were analyzed in terms of expected yields by each of the sawing methods.

AD-A035 636/0 PC A05/MF A01
Forest Products Lab., Madison, WI.
Individual Log Yields by Eight Sawing Systems
Forest Service research paper
Hiram Hallock, Abigail R. Stern, and David W. Lewis. Dec 76, 84p Rept no. FSRP-FPL-280-Suppl
Supplement to AD-A035 615.

Keywords: Lumber, Industries, Operations research, Production, Production engineering, Systems analysis, Mixtures, Wood, Sizes(Dimensions), Optimization, Saws, Industrial equipment, Computer programs, Computerized simulation, Tables(Data), *Sawmills, *Wood products, *Industrial plants, BOF(Best Opening Face) computer program, Best opening face computer program, Logs(Wood), Sawmills.

When a new sawmill or a major change in an existing sawmill is being planned, an important consideration is the inherent capability of each of the potential sawing systems to convert the available mix of logs into the most lumber. Through the medium of the Best Opening Face (BOF) computer program, eight sawing systems were used to saw a mix of logs encompassing all combinations of 5- to 20- inch diameters, 8- to 24 foot lengths, and 1 to 5 inches of taper. The results were summarized and published in USDA Forest Service Research Paper FPL 280, 'Is There a 'Best' Sawing Method'. For the person faced with making a systems selection choice using his own mix of logs, the complete data developed by the BOF program is essential. This paper contains that data and suggestions for its use. These tables are a supplement to USDA Forest Service Research Paper FPL 280. (Author)

AD-A035 981/0 PC A08/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Test Fills for Rock-Fill Dams
Final rept.
David P. Hammer, and Victor H. III Torrey. Mar 73, 170p Rept no. WES-MP-S-73-7

Keywords: *Dams, Rock, Compacting, Foundations(Structures), Construction equipment, Vibrators(Machinery), Rollers.

Data from 14 Corps of Engineers' (CE) rock test fill projects are summarized, and six of these projects are analyzed in detail. Variables most often investigated in these test fills were (1) lift thickness, (2) roller type, (3) number of roller passes, and (4) rock gradation. Measured parameters were (1) compaction, (2) permeability, and (3) grain-size distribution, both before and after compaction. The vibratory roller generally gave the best compaction, but also caused a substantial amount of surficial breakage for most rock types. It was found in most cases that better results were obtained with a vibratory roller when compacting material with the fines (sizes less than plus or minus 3 in.) removed. The possibility of using the Los Angeles abrasion test to predict rock breakage was explored. However, no conclusions could be drawn due to the lack of data and to the diversity of testing methods used in the projects studied. Recommend procedures for (1) planning and design, (2) construction, (3) measurements and observations, and (4) evaluation of results of future test fills are given.

AD-A036 072/7 PC A08/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Proceedings, Research Planning Conference on the Aquatic Plant Control Program. 22-24 October 1975, Charleston, S. C
Final rept.
Dec 76, 160 Rept no. WES-MP-A-76-1

Keywords: *Weed control, Aquatic weeds, Herbicides, Biological control, Aquatic plants, Conferences, State law, Pathogenic materials, Fishes, Streams, Inland waterways, Lakes, Aquatic organisms, Microorganisms, Water hyacinth, Rubber, Biodeterioration, Release mechanisms, Subtropical regions, United States, South America, Mexico, *Aquatic plant control, White amur fishes, 2-4-D herbicides, Silvex, Biological weed control.

Partial Contents: Status of Classification of Aquatic Herbicides; Aquatic Herbicide Tolerance; State Certification of Aquatic Herbicide/Pesticide Operations in Florida, Georgia, Texas, Oklahoma, and Arkansas; Aquatic Plant Problems in Puerto Rico; Reconnaissance Survey of Aquatic Weed Infestations in Lakes and Navigable Streams in Oklahoma; South American Field Studies of Prospective Biocontrol Agents of Weeds; Aquatic Weed Problems in Mexico and Texas and Some Measures for Control; Possible Effects of the Introduction of the White Amur into Lake Conway, Fla.; Aquatic Weed Versus Plant Pathogen -- A study of a biological control in action; Controlled Release Herbicides-Rubber formulations; 2,4-D in Slow-Moving Water; Extensive Degradation of Silvex by Synergistic Action of Aquatic Microoganisms; Integrated Control of Waterhyacinths with Four Biological Agents; Waterhyacinths-Nuisance of Benefit; and Large-Scale Field Test with the Monosex White Amur in Florida.

AD-A038 482/6 PC A07/MF A01
Michigan Univ., Ann Arbor. Dept. of Geography.
Urban Food Supply and Distribution: Characteristics and Utilization of Fresh Food Markets in Bangkok and Thonburi
Technical rept.
Margaret E. Crawford. 22 Feb 74, 127p Rept no. TR-5
Contract Nonr-1224(56)

Keywords: Fresh foods, *Marketing, *Thailand, Urban areas, Food, Commerce, Commodities, Supplies, Sources, Rural areas, *Food supply, Bangkok(Thailand), Thonburi(Thailand).

This report deals with one aspect of the problem of food supply and distribution to urban areas. It describes major internal characteristics of nearly two hundred fresh-food markets or talat in Bangkok Thonburi, Thailand. These characteristics are then summarized in a measure of market utilization. Indicators of change within the market system are identified along with market responsiveness in meeting the changing needs of a rapidly growing urban population. (Author)

AD-A041 516/5 PC A04/MF A01
Decisions and Designs, Inc., McLean, VA.
The Art of Cost-Benefit Analysis
Technical rept.
Baruch Fischhoff. Feb 77, 59p
Contract N00014-76-C-0074, ARPA Order-3052
Prepared in cooperation with Decision Research Corp., Eugene Ore., Rept. no. DR-76-10 and Perceptronics, Inc., Woodland Hills, Calif., Rept. no. PTR-1042-77-2.

Keywords: *Cost benefits, Cost analysis, Decision making, Acceptability, Value engineering, Trees, Judgement(Psychology), Probability, Toxic hazards, Nuclear energy, Earthquakes, *Management techniques, Benefit cost analysis.

Proposals for large-scale government and private projects are increasingly coming under the scrutiny of the cost-benefit analysis, decision analysis, risk assessment and related approaches. This paper presents a critical overview of such analyses. It discusses (1) their rationale; (2) their acceptability as guides to decision making; (3) the problems such analyses encounter; (4) how they may be misused; and (5) what steps are needed to increase their contribution to society. The dicussion is illustrated with a variety of examples drawn, in particular, from the evaluation of new technologies.

AD-A042 584/3 PC A03/MF A01
Office of Naval Research, London (England).
Efficiencies of Various Methods for Solar Energy Conversion
W. G. Soper. 20 Jun 77, 34p Rept no. ONRL-R-6-77

Keywords: Solar energy conversion, Solar cells, Heat engines, Efficiency, Hydrogen, Thermochemistry, *Solar energy, *Great Britain, Pyrolysis, Solar power generation.

Three methods are examined for converting solar energy to electricity or shaft work: heat engines, thermal decomposition of water to produce hydrogen and solar cells Maximum efficiencies of conversion are found to lie between 20% and 50%. For most applications, the heat engine is superior to the water splitting process. (Author)

AD-A044 343/2 PC A07/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Potential Nonstructural or Low Cost Waterways System Improvements
Final rept.
Frederick M. Anklam. Jun 71, 146p Rept no. WES-MP-O-71-1

Keywords: Water traffic, Inland waterways, Operational effectiveness, Utilization, Optimization, Low costs, Cost benefits, Regulations, Locks(Waterways), Commodities, Barges, Towing, Modification, Management planning and control, Questionnaires, *Waterway transportation.

The inland waterways system of the United States as it exists today has a number of problems associated with near-capacity traffic conditions. In many places on the Mississippi, Ohio, and Missouri Rivers and their navigable tributaries, there are serious impediments to the free flow of waterborne commerce. This study was conducted to determine the potential for more efficient utilization of existing inland waterways resources and facilities as a possible alternative to heavy investment in major construction. The study was based on distribution of a questionnaire, meetings and discussions with the Civil Works Task Group for Inland Waterways Systems Analysis, and visits to Corps of Engineers Civil Works offices and river sites by the author. The inland waterways system is an intimate interweaving of three significant subsystems: the physical waterway, the towing industry, and commodities. These subsystems and their interrelations are discussed in detail herein. It was determined that there are a number of areas of potential for improvement in the inland waterways system. These areas involve such items as changes in operating procedures of the locks, revisions of the operating rules for towboats approaching and using locks, staffing considerations, additional assistance at heavily trafficked locks, and other such factors.

AD-A044 578/3 PC A02/MF A01
Forest Products Lab., Madison, WI.
Particleboards from Lower Grade Hardwoods
Forest Service research paper
Bruce G. Heebink, and William F. Lehmann. Jun 77, 15p Rept no. FSRP-FPL-297

Keywords: Fiberboard, Hardwoods, Panels, Adhesive bonding, Urea, Phenols, Formaldehyde, Bending stress, Expansion, Sizes(Dimensions), Plywood, Strength(Mechanics), Stiffness, Accelerated testing, Aging(Materials), *Wood wastes, *Particle board, Commercial standard 236.

Properties and characteristics are reviewed for particleboards prepared from hardwood residues of a number of species. In general, hardwood particleboards met or exceeded the minimum properties defined in Commercial Standard CS 236 for both Type 1 (interior) and Type (2) exterior applications. However, certain anomalies in the data suggest need for further research in the areas of wood-adhesive interactions, particularly with the higher density hardwoods. An appendix of research references is included for hardwood usage in composite panel products other than particleboard. (Author)

AD-A044 765/6 PC A02/MF A01
Cold Regions Research and Engineering Lab., Hanover, NH.

Effect of Geography on the Extensive Agricultural Use of Sewage (Wpliyw Czynnika Geograficznego na Rozpowszechnienie Rolniczego Wykorzystania wod Sciekowych)
Jan Wierzbicki. Sep 77, 10p Rept no. CRREL-TL-642
Trans. of Gaz Woda Technika Santarna (Poland) v24 n11 p407-410 1950, by Sam Blalock.

Keywords: *Sewage disposal, Waste recycling, *Irrigation, Fertilizers, Rural areas, Agronomy, Agriculture, Urban planning, Climate, Terrain, Soils, Geographic areas, Land use, Waste management, Translations, *Poland, Sewage irrigation.

This article considers the causes of the elimination of many irrigated fields in England when the development of this kind of arrangement was appearing in other countries. Unfavorable local and soil climatic conditions necessitated the replacement of irrigated fields by purification plants of another type. The liquidation of irrigated fields in England and in the Eastern United States should not be an example for countries in which other geographic conditions predominate. The considerable simultaneous increase in arrangements of this type in other countries proves the incorrectness of uncritical copying of England's example and negative reaction to the agricultural use of sewage water in localities with conditions which favor its use. (Author)

AD-A044 767/2 PC A02/MF A01
Cold Regions Research and Engineering Lab., Hanover, NH.
Disadvantages and Advantages of Sewage Disposal in Connection with Agricultural Utilization (Wady i Zalety Oczyszczania wod Sciekowych w Polaczeniv Zolch Rolnicyzm Wykorzystaniem)
Jan Wierzbicki. Sep 77, 10p Rept no. CRREL-TL-645
Trans. of Gaz Woda Technika Sanitarna (Poland) v23 n6 p198-201 1949, by Sam Blalock.

Keywords: *Sewage disposal, Purification, Sewage treatment, Land use, *Irrigation, Fertilizers, Agriculture, Waste treatment, Waste recycling, Productivity, Utilization, Urban planning, Rural areas, Translations, *Poland, Sewage irrigation.

Although the purification of sewage in connection with agricultural use has certain disadvantages as mentioned in this report, the possibility of obtaining very significant economic advantages dictates the widest possible application of land treatment of sewage purification. (Author)

AD-A044 982/7 PC A02/MF A01
Stanford Univ., CA. Systems Optimization Lab.
Micro-Level Approaches for Improving Water Resource Knowledge Transfer in Rural Areas
Technical rept.
Nathan Buras. Jun 77, 18p Rept no. SOL-77-12
Contract N00014-75-C-0865

Keywords: *Water resources, Rural areas, Technology transfer, Irrigation systems, Water supplies, Water wells, Water quality, India, West Africa, Guatemala, Peru, Mexico, Israel, Conferences, Meetings, Developing countries, Information transfer.

One of the topics discussed at the Second International Conference on Transfer of Water Resources Knowledge (Colorado State University, Fort Collins, Colorado, June 29 - July 1, 1977) dealt with utilization of water resources knowledge in the context of regional development. Six papers were presented to the conference under this heading covering a broad range of issues: from a diagnostic description of a difficult situation in rural India, to a theoretical approach to the policy decisions relevant to rural modernization efforts. This general report summarizes the six papers, comments briefly on them, then focuses on two key points which were by-passed by the papers: (a) the resistance to change of farming communities at lower levels of technological sophistication; (b) attempts to overcome this resistance.

AD-A046 078/2 PC A04/MF A01
Forest Products Lab., Madison, WI.
Improved Utilization of Lumber in Glued Laminated Beams
Forest service research paper
Russell C. Moody. 1977, 52p Rept no. FSRP-FPL-292

Keywords: Lumber, Beams(Structural), Laminates, Adhesive bonding, Quality, Modulus of elasticity, Tensile strength, Shear strength, Compressive properties, Bending, Forests, Conservation, *Wood, *Building materials.

Evaluation of 120 glued laminated (glulam) beams provided criteria for improved utilization of lumber in such beams. Objectives were: (1) to determine if lumber grade can be somewhat reduced on the compression side of beams without significantly changing design strength; (2) to establish analytic procedures for incorporating lumber having had its modulus of elasticity (e) determined (E-rated lumber) into glulam beams; and (3) to determine the effect on beam properties of using lumber with limited wane. The procedures developed will provide those preparing specifications a wider raw material base for glulam timber, resulting in more efficient use of our timber resource.

AD-A047 981/6 PC A09/MF A01
Maryland Univ., College Park. Inst. for Fluid Dynamics and Applied Mathematics.
Environmental Conditions in a Tropical Forest Region in Thailand
Contract rept.
Helmut E. Landsberg, Owen E. Thompson, Robert E. Kaylor, and Rachel T. Pinker. Nov 74, 186p BN-799, PUB-109, ETL-0129
Contract DAAK02-72-C-0287

Keywords: Climate, Tropical regions, Meteorological data, Monsoons, Rainfall, diurnal variations, Seasonal variations, Rainfall intensity, Temperature, Forests, Weather stations, Weather forecasting, Southeast Asia, Thailand, Humidity, *Meteorology.

Major results of a two year project to study the climatological and micrometeorological conditions in a tropical evergreen forest region are summarized in this report. The study has been under the sponsorship of the U. S. Army Engineer Topographic Laboratory. The forest area under study is in the interior of Thailand and is influenced by a cool, dry northeast monsoonal flow from November to March and a warm, moist southwest monsoonal flow from May to September. Measured information were collected during a three year field program sponsored by the U. S. Army Natick Laboratories and included ground station temperature, relative humidity, precipitation, evaporation, hours of sunshine, and tower measurements of temperature, dew point temperature, and wind speed, incoming and reflected solar radiation, incoming and outgoing infrared radiation and sub-surface temperature profiles in the forest and in a cleared area within the forest region.

AD-A053 432/1 PC A02/MF A01
Cold Regions Research and Engineering Lab., Hanover, NH.
Waste Water Use for Feed Cropland (Ispol'zovaniye Stochnykh vod Dlya Orosheniya Kormovykh Ugodiy)
N. A. Kovaleva, L. F. Mikheyeva, and M. I. Demina. Apr 78, 6p Rept no. CRREL-TRANS-673
Draft, trans. of mono. Kupavna, Ministry of Amelioration and Water Utilization, All Union Scientific Research Institute for Utilization of Waste Water in Agriculture, 1976 4p.

Keywords: Irrigation systems, Farm crops, Sewage, Grasses, Grazing, Fertilizers, Domestic animals, Translations, *USSR, *Irrigation, Fodder, *Waste water reuse, Sewage irrigation, Corn plants.

One of the effective means for upgrading fodder-producing areas is to irrigate them with waste water. The experience of farms in Moscow, Leningrad, Kaliningradskaya, Volgogradskaya, and other oblasts in the RSFSR, the Ukrainian SSR, Latvian SSR and others indicates that meadows and pastures irrigated with sewage water grow 7,000-10,000 fodder units per hectare. Research and studies of the used field irrigation systems indicate not only the high effectiveness of the use of waste water in the irrigation of fodder crop land but, the high water retention effect, since each hectare uses up to 6,000-7,000 cubic meters of waste water per year. Computations indicate that factual possibilities for the development of waste water irrigation of fodder crops exist in many parts of our country, totaling an area of 2.6 million hectares, with an annual use of about 13 cubic kilometers of waste water.

AD-A054 601/0 PC A05/MF A01
Civil Engineering Lab. (Navy), Port Hueneme, CA.
Solar Heating of Buildings and Domestic Hot Water
Final rept. Jul 74-Dec 75
E. J. Beck, Jr, and R. L. Field. Nov 77, 88p Rept no. CEL-TR-835

Keywords: Solar heating, Housing(Dwellings), Hot water, Solar energy, Solar collectors, Water tanks, Heat transfer, Design to cost, Architecture, Sizes(Dimensions), Fuel consumption, Savings, Investments, Bibliographies, *Solar heating systems, Solar space heating, Hot water heating, *Solar water heating, Houses, Insulation, Cost analysis.

The purpose of this document is to provide guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. The calculation procedure is based on parametric curves for 'fraction of heating load supplied by solar energy' and several 'rules of thumb' for design. A series of 11 worksheets is used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling, and the other DHW supply for a dispensary. Neither was found to be cost effective when competing against present day prices for natural gas. A directory of manufacturers and bibliography is also included. (Author)

AD-A057 032/5 PC A02/MF A01
Office of the Chief of Engineers (Army), Washington, DC.
Fish Production in China. Transportation of Fish Eggs, Fry and Young
Yuh-Farn Chang. Jul 78, 21p

Keywords: *Fishes, Eggs, *Transportation, Fisheries, Containers, Barrels, Production, Density, China, Handling, Fishing industry, Aquaculture, Dissolved gases, Oxygen, Carp, Mullets, Bigheads, Cargo transportation.

The proper transportation and handling of fish eggs and fry is a vital part of any fish production system. Careful planning is important. The first thing to decide is the type of container to be used to hold the fish. There are buckets and barrels of many sizes and designs, each with different characteristics. A second consideration is the density to which the fry should be packed in the container. This must be as dense as possible to save space and money, but not so dense as to kill the fish. The two most important factors in determining the maximum allowable density are water temperature and dissolved oxygen levels. Fish fry and eggs are shipped by three major means: by land, by water, and by air. This involves either trucks, trains, boats, airplanes, or human labor. Each method has advantages for different situations. During any form of transportation, water maintenance is necessary. If some sort of method for replenishing dissolved oxygen is used, replacement of water can be put off, but still not avoided. The source of fresh water must be inspected carefully before it is used. Clean pond water appears to be best. Any temperature difference between old and new water should be minimized. In more recent years, cultivation of mullet species has become prominent, moving in with the more traditional species, the carps and the bigheads. Most of the techniques used for the transportation of all species, including mullet, apply to their eggs. (Author)

AD-A057 315/4 PC A03/MF A01
Office of the Chief of Engineers (Army), Washington, DC.
Fish Production in China. The Rearing of Fish Fry and Fingerlings
Yuh-Farn Chang. Jul 78, 43p

Keywords: *Fishes, Fisheries, *China, Breeding, Production, Cleaning, *Ponds, Reproduction(Biology),

Aquaculture, Dredging, Pest control, Calcium oxides, Bleaching agents, Effectiveness, Animal nutrition, Feeding stuffs, Fertilizers, Sewage, Manure, Leguminous plants, Byproducts.

The supply of fish fry and fingerlings is of primary concern to the fish culturing industry. In order to increase the supply, it is necessary to improve rearing techniques. The first of many parts to this program is to improve pond condition. It is recommended that rearing ponds be drained and cleaned once a year. The cleaning process involves treatment with various chemical substances, and simple mud removal (dredging). This reduces the incidence of disease, eliminates pest species and other harmful organisms, and facilitates repair of the pond's structure. Many different chemicals can be used, although lime and bleaching powder seem to be the most effective. The second area to be considered is that of fry nutrition. Different [illegible] have different food preferences. For this [illegible] can be found in different areas of the [illegible] species of fish, slightly different pond [illegible] conditions are considered optimal. The [illegible] used are grass, cow manure, soybean [illegible] and peanut cakes. Recent experiments using human sewage have proven very successful, with exciting prospects for the future. A third consideration is the selection of a suitable rearing pond. Characteristics of a good pond are: an ample water source, appropriate size and depth, circular shape, level bottom, non-leaking, and plenty of sunlight.

AD-A058 106/6 PC A02/MF A01
Forest Products Lab., Madison, WI.
Use of Wood in Mobile Homes is Increasing
Forest Service resource bulletin
H. Edward Dickerhoof. 1978, 24p Rept no. FSRB-FPL-4

Keywords: *Housing, Lumber, Mobile, Construction, Standards, Plywood, Gypsum, Mathematical analysis, *Wood, *Fuels, Mobile homes, Softwoods, Hardwoods, Gypsum board, Houses, Trailers.

In recent years increased amounts of dimension lumber have been used per mobile home unit. This is a result of increasingly stringent construction standards adopted during the mid-1970's and because the average size per unit has increased. The demand for conventional exteriors in double-wide mobile homes has brought about large increases in the use of softwood and hardwood plywood. Gypsum board has been used increasingly as an alternative to hardwood plywood for interior walls. (Author)

AD-A058 861/6 PC A02/MF A01
Association of Scientists and Engineers of the Naval Sea Systems Command, Washington, DC.
Why Not Sails
Kenneth C. Morisseau. Mar 78, 23p
Proceedings of the Annual Technical Symposium (15th), Association of Scientists and Engineers of the Naval Air and Sea Systems Command, Washington, DC 1978.

Keywords: Marine propulsion, Wind, Naval architecture, Energy conservation, Technology forecasting, Prototypes, Trade off analyses, Ship hulls, *Wind energy, *Boats, Sailboats.

With the shortage of fossil fuels becoming a serious problem and the high cost and environmental hazards of nuclear propulsion, it appears to be a good time to go back and take a hard look at the use of sails as the device and wind as the energy source for ship propulsion. (In the interest of adding credence to what may be considered a questionable endeavor, it should be noted that serious studies are being made both in Britain and West Germany concerning the practicality of sail propulsion for commercial vessels.) The paper reviews the history of sails as a means of propulsion, the capabilities and limitations of modern sailing ship designs with both conventional displacement hulls and unconventional hull forms such as semi-submersible and hydrofoil supported considered. A variety of designs to suit naval and commercial applications are provided for further consideration. (Author)

AD-A060 212/8 PC A08/MF A01
Miami Univ., FL. Dept. of Dermatology.
Fungous and Bacterial Skin Infections in the Tropics
Final rept. 1 Jun 71-31 May 76
David Taplin. Aug 78, 114p
Contract DADA17-71-C-1084

Keywords: Bacterial diseases, Fungus diseases, Infectious diseases, Tropical diseases, Skin diseases, Tropical regions, Epidemiology, Therapy, Chemotherapy, Preventive medicine, Panama, Venezuela, Costa Rica, Guatemala, Vietnam, Soaps, *Diseases, *Fungi, Tinea corporis, Tinea cruris, Tinea pedis, Columbia, Infections.

Bacterial skin infections in the tropics are the predominant cause of dermatological disease in civilians and are directly related to temperature, humidity, exposure, and living conditions. Substandard housing and poor hygiene, biting and vector insects contribute to high rates of infection. Tropical skin infections are usually streptococcal. In military populations, personnel on field operations are at highest risk. Support troops, even in the tropics, have a much lower incidence of streptococcal pyoderma. Currently available deodorant soaps do not prevent skin infections, but chlorhexidine gluconate looks promising. Epidemic furunculosis is related to close social contact, and may be more common than most physicians realize. Early treatment with antibiotics plays a significant role in prevention of new furuncles among contacts. Antibiotic resistant strains of bacteria pose new problems in cutaneous microbiology. Severe fungal infections of the skin may attack up to 70% of military personnel in hot humid environments. Occlusion is the most significant factor, and appears to be related to accumulation of CO2 under damp clothing. Combined therapy of tinea corporis/cruris with topical miconazole/hydrocortisone is highly effective. Hydrocortisone alone makes these infections worse in the tropics. Topical clotrimazole is effective in the treatment of dermatophytosis, but tinea pedis is difficult to treat and usually recurs.

AD-A060 779/6 PC A12/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Proceedings, Research Planning Conference on the Aquatic Plant Control Program Held at New Orleans, Louisiana on 3-6 October 1977
Final rept.
Aug 78, 270p Rept no. WES-MP-A-78-1

Keywords: Aquatic plants, Plant growth, Environmental management, Conferencing(Communications), Louisiana, Army Corps of engineers, Environmental engineering, Marine biology, Water hyacinth, Experimental data, Waterways, Control, Harbors, *Weed Control, Eurasian watermilfoil, *Aquatic Plant Control, Pest control.

The 12th Annual Meeting on the U. S. Army Corps of Engineers Aquatic Plant Control Research Program was held in New Orleans, La., on 3-7 October 1977 to review current operations activities and to afford an opportunity for presentation of current research projects. (Author)

AD-A061 469/3 PC A03/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Concrete for Earth-Covered Structures
Final rept.
James E. McDonald, and Tony C. Liu. Sep 78, 31p
WES-MP-C-78-15, CTIAC-34

Keywords: Underground structures, *Concrete, Waterproofing, Permeability, Moisture, Porosity, Fiber reinforced composites, Strength(Mechanics), Habitability, Construction materials, *Reinforced concrete, *Ferrocement, Earth covered structures.

Low permeability to water is a primary consideration in the design and construction of earth-covered concrete structures. Factors affecting the permeability of concrete are generally classified into three groups: (1) constituent materials; (2) methods of concrete preparation; and (3) subsequent treatment of the concrete. Each group of factors is examined in this paper and recommendations are made on how to obtain concrete that is virtually impermeable. Also, some specialized concretes with potential applications in earth-covered structures are discussed briefly. These include polymer-impregnated, polymer, and fiber-reinforced concretes and ferro-cement. (Author)

AD-A062 903/0 PC A06/MF A01
Middlebrooks and Associates, Logan, UT.
Wastewater Stabilization Pond Linings
Special rept.
E. Joe Middlebrooks, Catherine D. Perman, and Irving S. Dunn. Nov 78, 118p CRREL-SR-78-28
Contract DACA89-77-C-1895

Keywords: *Waste water, *Ponds, Sealing compounds, Linings, Soil stabilization, Waste treatment, Environmental protection, Asphalt, Concrete, Plastics, Costs, Protective coatings, Moistureproofing, Wastewater stabilization lagoons, Bentonite, Water pollution control, Hydrology.

A review of the literature on wastewater stabilization lagoon linings covering the work during the past 20 years is presented. Design, operating and maintenance experiences are presented for soil sealants, natural sealants, bentonite clays, chemical treatments, gunite, concrete, asphaltic compounds, plastics and elastomers. The characteristics of various materials, applicability to different wastes, construction techniques and details of installation techniques are presented. Installation costs for various materials and comparative costs are summarized. A summary of reported seepage rates for various types of lining materials is presented. A survey of the 50 states was conducted to determine the requirements for liners and allowable seepage rates. Requirements are varied and depend upon the local soil conditions and the experiences of the regulatory agencies with various materials. The trend is toward more stringent requirements. Accepted design and installation procedures are summarized, and detailed drawings of installation techniques are presented. Recommendations of the manufacturers and installers of liners are also presented. (Author)

AD-A075 140/4 PC A02/MF A01
Army Facilities Engineering Support Agency, Fort Belvoir, VA. Technology Support Div.
Ceiling Fans for Energy Conservation
Final rept.
George T. Story. 16 May 79, 14p Rept no. USAFESA-TS-2069

Keywords: Ventilation fans, *Energy conservation, Chambers, Room temperature, Stratification, Heat loss, *Buildings, Ceiling fans.

Considerations for the use of ceiling fans to conserve energy are given. A sample calculation of energy savings is included. (Author)

AD-A083 956/3 PC A07/MF A01
Army Military Personnel Center, Alexandria, VA.
Institutionalization of Rural Credit in India: A Focus on the Cooperative Credit Movement
Final rept.
Richard Kenneth Rankin. May 80, 131p
Master's thesis.

Keywords: Rural areas, Finance, Sources, Agriculture, Economics, Theses, *Agricultural economics, *India, *Banking, Foreign Technology, Credit.

Since the turn of the twentieth century, there has been an effort in India to replace the usurious moneylender with institutionalized forms of rural credit. This attempt became more critical with the coming of the Green Revolution (1960's) and the associated increase in demand for rural credit. Primarily the Government of India has relied on the Cooperative Movement in its effort to institutionalize the supply of rural credit. This thesis examines some of the major problems and obstacles encountered as well as corrective measures taken with respect to the cooperative movement. (Author)

AD-A084 173/4 PC A09/MF A01
Army Military Personnel Center, Alexandria, VA.
The Development of Guidelines for a Statistically Based Process Control System for the Earthwork Phase of Earth Dam Construction Projects
Final rept.
William D. Roudabush. Mar 80, 177p
Master's thesis.

Keywords: Earth dams, Earthwork, Quality control, Cores, Soils, Compacting, Control systems, Statistical data, Charts, Embankments, Theses, *Dams, Statistical quality control, Process control.

This thesis provides a contractor involved in earthen dam construction with the appropriate tools and techniques needed to develop and implement a statistically based process control system for the the impervious zone (or core). Initial research consisted of an extensive literature search to obtain background material related to compaction of embankments and obtaining the plans, specifications, and test data from the Corps of Engineers dam site used as an example in the thesis. Personal interviews were conducted with contractor and Corps personnel at the dam site directed toward gaining insight into the current practices involved in Corps dam construction projects and their comments concerning feasibility of a statistically based process control system. The practical situation observed and implemented on the Corps dam for embankment compaction of earthen dams was meshed with the theory of statistically based process control. A set of guidelines was developed for a contractor to use to set up statistically based process control techniques involved in analyzing test data for the for the impervious zone of an earthen dam.

AD-A084 969/5 PC A08/MF A01
Naval Postgraduate School, Monterey, CA.
Application of Technology Transfer Process Model for Thailand
Master's thesis
Pairoat Kaensarn. Mar 80, 109p

Keywords: *Thailand, *Technology transfer, Models, Economics, Religion, Culture, Psychology, Theses.

The physical background of the country, national economy, and some characteristics of Thai people, which, from the author's perspective, have significant influences on the elements of the model and the knowledge transfer process itself are described. Each element of the model is discussed as to how it is affected by organizational factors. Economic, religious and cultural factors are considered. At the end of the study, a recommended strategy to improve the effectiveness of the knowledge transfer process and the efficiency of knowledge utilization within the country is proposed. The anticipated improvement of the transfer process is also briefly discussed.

AD-A086 073/4 PC A99/MF A01
Forest Products Lab., Madison, WI.
Tropical Timbers of the World
Martin Chudnoff. Apr 80, 829p

Keywords: *Wood, Trees, *Tropical regions, Handbooks, Geographical distribution, Sizes(Dimensions), Weight, Mechanical properties, Drying, Shrinkage, Mechanical working, Preservation, Statistical data, Timber, Tropical woods.

Over the past two decades U.S. lumber imports from the tropics have increased fourfold. Plywood trade, mostly from Asian sources, has soared forty-fold and now equals our domestic production. Log imports, though, have decreased drastically from about 100 million board feet (log scale) in the 1950's to 30 million currently. Much of the world timber trade now is in the form of processed material. Many more tropical wood species and species groupings are being made available to U.S. processors. Most of these have been well known for many years on the European markets. This interest in supplemental supplies from overseas is in both softwoods and hardwoods. An extensive foreign literature has described the properties and uses of tropical woods, but much of it is no longer readily available. In this country the U.S. Forest Products Laboratory, over the years, issued 'Information Leaflets' or 'Foreign Wood Series' reports on some species of importance. But many of these are now out of print. The most recent comprehensive document, 'Properties of Imported Tropical Woods,' contained a description of about 100 tropical genera.

AD-A089 030/1 PC A05/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Instructions on the Use of the Layer-by-Layer (Toktogul') Method of Placing Concrete in Hydraulic Engineering
Jul 76, 84p

Keywords: *Concrete, *Construction, *Dams, Casting, Layers, Cooling, Translations, *USSR, Concrete blocks.

No abstract available.

AD-A089 031/9 PC A07/MF A01
Joint Publications Research Service, Arlington, VA.
Directives for Planning the Transitional Zones of Earthfill Dams
I. Ye. Dubrovskiy, and L. F. Setko. Jul 76, 126p

Keywords: Earth dams, Earth fills, Soils, Soil mechanics, Granules, Translations, *USSR, *Dams, Foreign technology.

No abstract available.

AD-A089 033/5 PC A04/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Construction Norms and Regulations: Planning Norms--Dams Made from Earth Materials
L. G. Bal'yan. Jul 76, 57p

Keywords: Earth dams, Construction, Construction materials, Embankments, Foundations(Structures), Drainage, Hydraulic equipment, Filling, Rock, Translations, *USSR, *Dams, Hydraulic earthfill dams, Rockfill dams.

No abstract available.

AD-A091 881/3 MF A01
Uniroyal, Inc., Naugatuck, CT. Consumer Products Div.
Production of Insulated Footwear Using Liquid Injection Molding Equipment. 1. Method
Final rept. 15 Sep 77-15 Jul 79
James H. Flood. 15 Jul 79, 135p NATICK/CEMEL-216
Contract DAAK60-77-C-0071
Availability: Microfiche copies only.

Keywords: Boots, Injection molding, *Industrial plants, Insulation, Industrial production, *Footwear, Manufacturing, Production rate, Polyurethane resins, Protective coatings, Electrostatics, Linings, Fabrication, Lightweight.

The objective of this project was to set up and demonstrate a manufacturing line capable of continuous production of 60 pairs per week of lightweight insulated boots from liquid injection molded expanded polyurethane. This report describes in detail all production equipment, production methods, and process conditions used to fabricate the lightweigth insulated boot. Cycle times for the various major operations are included based on the optimum operation of the equipment. Mold requirements, equipment layouts and operations flow chart are listed. (Author)

AD-A093 075/0 PC A02/MF A01
Forest Products Lab., Madison, WI.
Accelerating the Kiln Drying of Oak
Forest Service research paper
William T. Simpson. Sep 80, 12p Rept no. FSRP-FPL-378

Keywords: Lumber, Industrial production, *Drying, Steam, *Wood, *Industrial plants, Moisture content, Surface finishing, Production rate, High temperature, Hardwoods, Quality.

Reducing kiln-drying time for oak lumber can reduce energy requirements as well as reduce lumber inventories. In this work, 1-inch northern red oak and white oak were kiln-dried from green by a combination of individual accelerating techniques--presurfacing, presteaming, accelerated and smooth schedule, and high-temperature drying below 18 percent moisture content. Results were compared with those achieved by conventional kiln drying. Drying time in the combined techniques procedure was reduced by more than 50 percent. The results for quality of the lumber were mixed. In most of the material, the quality was acceptable, but enough honeycomb was present to be of concern. (Author)

AD-A093 108/9 PC A03/MF A01
National Defense Univ., Washington, DC. Research Directorate.
New Imperatives in Socio-Economic Development: Nations Helping People to Help Themselves
Marshall Green. Nov 80, 26p Rept no. NATL SEC AFFAIRS ISSUE PAPER-80-2

Keywords: Developing nations, Villages, Rural areas, *Employment, *Agricultural economics, Modification, Foreign aid, Economic development, Social development.

Topics include: Population Growth and Overcrowded Cities; Renewed Focus on Rural and Village Development; Enlisting the Positive Support and Skills of the Rural Masses; Setting Realistic Sights; Implications for U.S. A.I.D. Policies and Programs; and Implications for Easing North-South Differences.

AD-A094 988/3 PC A03/MF A01
Aeronautical Research Labs., Melbourne (Australia).
Wind Energy - How Reliable
Structures rept.
Douglas J. Sherman. Jan 80, 36p Rept no. ARL/STRUC-380

Keywords: Wind, Mechanical energy, Electric power production, Reliability, Storage, Wind velocity, Variations, Statistical analysis, *Wind energy.

The reliability of a wind energy system depends on the size of the propeller and the size of the back-up energy storage. Design of the optimum system for a given reliability level can be performed if a time series of wind speed data is available. However, a design based on conventional meteorological records, which sample the wind speed with a ten minute averaging time at three-hourly intervals, will over-estimate the storage by a factor of approximately 2, and if the wind speed is only available on a daily basis the storage will be overestimated by a factor of 2.5 to 4.0. This is because a propeller can respond to wind speed changes in much less than ten minutes and also because three-hourly sampling does not often pick up the brief high-speed incidents which generate a significant part of the wind energy. A nomogram is presented, based on some continuous wind speed measurements, which enables storages calculated from three-hourly or daily data to be appropriately reduced because of these two effects. (Author)

AD-A095 128/5 PC A04/MF A01
Directorate General of Army Health Services, Canberra (Australia).
Proceedings of the Meeting of Australian Research Workers on Malaria (1st) Held at Ingleburn, 22-24 February 1980
1980, 58p Rept no. DGAHS-158/80

Keywords: *Malaria, Symposia, Diagnosis(Medicine), Epidemiology, Pathology, Preventive medicine, *Diseases, Foreign technology.

Partial Contents: Summary of the Discussions on Selected Subjects of Research on Malaria--diagnosis of Malaria, Epidemiology and Control of Malaria, Pathology and Clinical Aspects of Malaria, Malaria Prophylaxis and Treatment; Venue of Future Meetings of Australian Research Workers on Malaria.

AD-A095 280/4 PC A04/MF A01
Department of State, Washington, DC. Office of External Research.
Ten Decades of Rural Development: Lessons from India
Rural development paper no. 1
Akhter Hameed Khan. 1978, 54 FAR-29370
Prepared in cooperation with Michigan State Univ., East Lansing. Dept. of Agricultural Economics.

Keywords: *India, Rural areas, Foreign aid, Community relations, *China, Models, *Agricultural economics.

Contents are as follows: The Colonial Connection; Perception of Four Major Rural Problems; New Ideological Challenges; Rival Ideologies; World War II And the Two Camps; American Leadership and Aid; The Shifts in Emphasis; The Chinese Model of Rural Development; Special Project, and the Seventies--A Decade of Consolidation of Two Models: Indian and Chinese.

AD-A096 738/0 PC A02/MF A01
Naval Medical Research Unit No. 2, Manila (Philippines).
Intestinal and Blood Parasites of Man on Alor Island, Southeast Indonesia
Technical rept.

Arbain Joesoef, and David T. Dennis. 1980, 9p Rept no. NAMRU-2-TR-850

Keywords: Parasites, Intestinal parasites, Parasitic diseases, Blood diseases, Humans, Epidemiology, Surveys, Indonesia, Malaria, Filariasis, Statistical data, Tables(Data), Reprints, *Diseases.

No abstract available.

AD-A098 945/9 PC A04/MF A01
Forest Products Lab., Madison, WI.
Biological Utilization of Wood for Production of Chemicals and Foodstuffs
Forest Service research paper
George J. Hajny. Mar 81, 87p Rept no. FSRP-FPL-385

Keywords: *Wood, Industrial production, *Chemical industry, *Food, Trees, Residues, Cellulose, Lignin, Chemical derivatives, Sugars, Alcohols, Fermentation, Yeasts, Hydrolysis, Percolation, Nutrients, Feeding, Animal husbandry.

In the long term, mankind will have to depend on solar energy and photosynthetic processes rather than on fossil materials for energy and material needs. Cellulose and the hemicelluloses, which make up about 70 percent of the dry matter of trees and shrubs, are the most abundant, renewable, raw materials on earth. At present, the highest uses of wood are for structural material and as a source of fiber. There are, however, large quantities of wood residues produced during harvesting and manufacture that might be used. Intensive silviculture can greatly increase the supply of wood for all purposes. This paper reviews the work the U.S. Forest Products Laboratory has done over nearly 70 years to produce chemicals and feedstuffs from wood residues. Wood has been converted successfully to fermentation chemicals such as ethyl alcohol, glycerol, arabitol, erythritol, butanol, acetone, and 2,3-butylene glycol as well as to feedstuffs such as molasses and yeast, and to wood modified to make the polysaccharides digestible by ruminants. At present such use of wood is economically marginal, but is potentially economic in the future. (Author)

AD-A100 576/8 PC A13/MF A01
Foreign Technology Div., Wright-Patterson AFB, OH.
Handbook of Equipment Repair
14 May 81, 292p Rept no. FTD-ID(RS)T-0685-80

Keywords: Materials, Parts, Repair, *Maintenance, Specifications, Metals, Rubber, Plastics, Asbestos, Translations, *China.

No abstract available.

AD-A101 957/9 PC A02/MF A01
Walter Reed Army Inst. of Research, Washington, DC.
The Economics of Seed Handling
Lynn W. Kaufman, and George Collier. 1 Sep 79, 17p

Keywords: Food dispensing, Feeding, Economics, Food consumption, *Seeds, Selection, Nutrition, Calorific value, Diet, Costs, Rats, Reprints.

No abstract available.

AD-A112 298/5 PC A03/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
Organization and Management of Construction in Developing Countries
Maria Pavlidou. Feb 82, 45p

Keywords: *Management planning, Economic analysis, *Construction, Developing nations, International politics, Industries, Work, Jobs, Housings, Organizations, International trade, Perception(Psychology), Human factors engineering, Imports, India, Malta, Rumania, Turkey, South Africa, West Indies, Army research.

Discussion covers organizational forms for construction in developing countries; management of design, the firm, and the project; the influence of human factors; the role of mass housing and industrialized construction; and specific practices in India, Malta, Rumania, Turkey, South Africa, and the West Indies. (Author)

AD-464 900/0 PC A02
Special Operations Research Office, Washington, D. C. Counterinsurgency Information Analysis Center.
Irrigation as a Factor in the Economic Development of Thailand.
James R. Price. Jun 64, 10p Rept no. SORO/CINFAC/1-64
Contract DA-49-092-ARO-7

Keywords: *Irrigation, *Thailand, Cereals, Irrigation systems, History, Economics, Floods, Counterinsurgency, Agriculture, Rural areas.

The question of irrigation and flood control in Thailand has been historically bound together not only with the immediate problems of production of Thailand's main export crop of paddy rice, but with the pattern of Thailand's foreign economic and political relations. Developmental irrigation and flood control projects only now nearing completion are virtually identical to those recommended more than half a century ago by a Dutch irrigation adviser, and which could have been completed within twelve years at a fraction of the cumulative costs, both in capitalization and crop losses, to date. (Author)

AD-600 859/3 PC A02
Forest Products Lab Madison Wis
Woodworking Machines.
May 64, 2p FPL-048

Keywords: Machines, Wood, Saws, *Wood, Milling Machines, Industrial Equipment, Material Separation, *Sawmills, *Industrial plants, Woodworking Machines.

Woodworking machines are made to do a wide variety of jobs. For any one job there are usually a number of makes, sizes, and styles of machines from which to choose. They are not standardized. Only a brief classification and outline of specifications for fairly typical machines of the more important types is attempted. Small light machines of the home workshop size are not included. Woodworking machines may be divided into three broad classes based on function: sawmill, planing mill, and industrial plant machinery. The function of sawmill machinery is to cut the log into rough, green lumber. The planing mill takes the rough lumber (usually dry), and prepares it for general construction uses, such as flooring, siding, shiplap, or framing. The industrial plant cuts up lumber and makes it into doors, furniture, boxes, or other fabricated products. (Author)

AD-643 179/5 PC A17/MF A01
Boston Univ., Mass. Dept. of Geography.
Fire in Tropical Forests and Grasslands.
Technical rept.
Robert B. Batchelder, and Howard F. Hirt. Jun 66, 396p ES-23
Contract DA-19-129-AMC-229(N)

Keywords: Fires, *Tropical regions, Forest fires, *Grass, Meteorology, Soils, Control, Armed forces research, Climatology, Culture, Ecology, Maps, *Forestry, *Fire safety.

Fire in the tropics has a long history in which frequent wide-spread burning has profoundly altered physical and cultural environments. A vast and diverse literature pertaining to fire and its effects in tropical forests and grasslands was evaluated, classified and presented in a selected bibliography. Emphasis is on the relation of fire to climate, natural vegetation, soils, cultural origins, technological level and way of life and other significant factors of the total environment. The incidence and frequency of occurrence of fire are examined in terms of the geographic distribution of passive and active environmental characteristics. The relationship of burning to climate and natural vegetation is shown on maps which represent a first attempt to depict the geographic distribution of fire in the tropics. Potential combustibility and the implications of fire to military operations are discussed. (Author)

AD-651 116/8 PC A04/MF A01
American Univ., Washington, DC. Center for Research in Social Systems.
Resettlement in Latin America: An Analysis of 35 Cases.
Milton Jacobs, Alexander R. Askenasy, and Norita P. Scott. Apr 67, 55p
Contract DA-49-092-ARO-7

Keywords: *Management planning, *Latin America, Government(Foreign), Economics, United States government, Agriculture, Military training, Population, Political science, Social sciences, Rural areas, Education, Medicine, *Housing, Federal budgets.

A study of agricultural settlements (or colonies) in Latin America: the history of settlement, current governmental efforts in colonization, and an analysis of the colonies in terms of success or failure are included. Detailed description of five of the settlements is appended.

AD-653 856/5 PC A03/MF A01
Naval Research Lab., Washington, DC.
Natural Resistance of Woods to Biological Deterioration in Tropical Environmentr. Part I. Screening Tests of a Large Number of Wood Species.
Interim rept.
C. R. Southwell, C. W. Hummer, Jr, B. W. Forgeson, T. R. Price, and T. R. Sweeney. 7 Feb 62, 49p Rept no. NRL-5673-Pt-1

Keywords: *Wood, Biological contamination, Tropical deterioration, Identification, Sampling, Exposure, Test methods, Marine borers, Resistance(Biological), Isoptera, Degradation, Tropical tests, Sea water, Soils, Fungus deterioration.

In four different tropical environments, heavily infested with wood-destroying organisms, 114 species of scientifically identified woods have been undergoing a screening test for periods up to an 18-month exposure. Many of the woods were selected because of their reputed resistance to biological attack. Results of marine borer resistance studies have revealed 21 woods to be highly resistant to borers in Pacific Ocean water for the first 14 months of exposure. In tropical brackish water only 3 woods studied were highly resistant and very heavy damage was observed on 69 during the 14-month period. Stake tests in tropical jungle soil on both the Atlantic and Pacific Coasts of Panama showed 26 woods to be very durable to both subterranean termites and fungal decay for the first 18 months of exposure. A number of these resistant woods had not been studied previously. From the results of these studies, each wood included has been assigned resistance ratings of high, moderate, or low in respect to marine borer attack in sea water, teredo attack in brackish water, subterranean termites in tropical soil, and fungal decay in contact with jungle soil. Detailed descriptions of wood species which are considered to be of special interest are included. (Author)

AD-668 852/7 PC A09/MF A01
Arizona Univ., Tucson. Inst. of Arid Lands Research.
Inventory of Research on Vegetation of Desert Environments.
William G. McGinnies. 1967, 190p
Contract DA-49-092-ARO-71
Chapter 6 of Inventory of Geographical Research on Desert Environments. See also Chapter no. 5, AD-684 013.
Availability: Published in Copyrighted journal.

Keywords: *Plants(Botany), *Deserts, Reviews, Scientific research, Trees, Grasses, Periodic variations, Colors, Soil mechanics, Physical properties, Sand, Fires, Herbicides, Food, Fibers(Natural), Insects, Fuels, Tables, Bibliographies.

The objective of the study chapter is to review and evaluate existing information and research on the vegetation of the deserts of the world, to ascertain notable deficiencies, and to propose possible future research and improvements to the general body of knowledge of desert vegetation. (Author)

AD-66[illegible] 853/5 PC A02/MF A01
Arizona Univ., Tucson. Inst. of Arid Lands Research.
A General Summary of the State of Research on Ground-Water Hydrology.
Eugene S. Simpson. 1967, 24p
Contract DA-49-092-ARO-71
Chapter 8 of Inventory of Geographical Research on Desert Environments. See also Chapter 6, AD-668 852.
Availability: Published in Copyrighted journal.

Keywords: *Hydrology, *Deserts, Water, Terrain, Natural resources, Reliability, History, Well logging, Surface properties, Dams, Underground, Drainage, Stor-

age, Physical properties, Management planning, Sources, Israel, *Ground-water.

This report is one of a series under a program started in November, 1964, entitled 'An Inventory of Geographical Research on Desert Environments.' Geographic areas covered by the inventory were generally those classified as arid or extremely arid. Some variation in coverage occurs from chapter to chapter, without change in the objective of compiling and presenting the greatest possible amount of useful information in the allotted time. The purpose of the inventory is to determine in detail what topics have been or are being investigated for the world's deserts, to appraise the reported work, and to disclose areas of study where further work is needed. The series of chapters does not attempt to recapitulate all information known about the deserts of the world, but rather comprises a compendium-guidebook to past and present research. It is based upon a critical review of the published literature augmented by consultations with specialists. (Author)

AD-671 856/3 PC A08/MF A01
Mcgill Univ Montreal (Quebec) Dept of Geography
The Ecology of the Forest/Savanna Boundary (Proceedings of the Igu Humid Tropics Commission Symposium, Venezuela, 1964).
Technical rept. on Savanna Research Project
Theo L. Hills, and Roland E. Randall. May 68, 153p
Rept nos. TR-14, Savanna Research Series-13
Contract Nonr-3855(00)

Keywords: *Plants(Botany), *Ecology, Trees, Grass, Rainfall, Distribution, Climatology, Soils, *Forestry, History, Paleontology, Floods, *Deserts, Fires, Animals, Humidity, Symposia, *Tropical regions, Venezuela, Canada, Savannas.

The report is the outcome of a symposium on the ecology of the forest/savanna boundary. The papers presented at the meeting have been cut and edited so that a theme is presented rather than a series of papers. In the introduction, the problems involved in savanna classification and the ambiguity of terminology are discussed, types of savanna found in different parts of the world described, and methods of examination analysed. The section is concluded by a description of the field trip made by the Symposium members, during which many of the differences in attitude were seen in a fresh light. A second chapter is concerned with savanna/forest boundaries held stable by factors of the physical environment; here the roles of flooding and desiccation, climate, soils and geomorphology are examined. In the third chapter the authors discuss stable boundaries resulting from human action. Fire and the role of domesticated grazing animals are seen as the major factors. The subject of the fourth section is the boundary when not in equilibrium. Many factors are examined in different parts of the world including soil, wild animals, fire, palaeoclimatology and man. An evaluation is made of the use of palynological and historical data. (Author)

AD-675 354/5 PC A02/MF A01
National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
Opening Unserviced LOTS to Building by Use of Septic Tank.
Housing Note
W. B. Watson. Jul 66. 6p Rept no. HN-27
Reprinted from Canadian Builder, v16 n5 p42-45 May 66.

Keywords: *Sewage disposal, Rural areas, Tanks(Containers) Hazards, Soils, Terrain, Population, Design, Economics, Operation, Maintenance, Substitutes, Specifications, Public health, Canada, *Septic tanks.

The value, construction, maintenance, and operation of septic tanks in isolated areas are discussed, along with problems and hazards.

AD-676 124/1 PC A05/MF A01
Applied Scientific Research Corp of Thailand Bangkok
Tropical Environmental Data (Trend): Cooperative Research Programme No. 27.
Semiannual rept. no. 2, 1 Jul-31 Dec 67.
1968, 96p
Contract DAJB29-67-C-0122

Keywords: *Forestry, *Tropical regions, Rainfall, *Thailand, Hydrology, Micrometeorology, Soils, Materials, Deterioration, Bacteria, Fungi, Periodic variations, Rivers, Terrain, Mapping, Evapotranspiration, Sensors, Atmospheric temperature, Plants(Botany), Dry-evergreen forest.

The programme is an interdisciplinary study of a dry-evergreen forest environment in the 1,500 mm annual rainfall zone about 300 km north-east of Bangkok and 60 km south of Nakhon Ratchasima (Khorat). The programme is providing a reference framework of data on environmental factors, particularly those which relate to tropical deterioration of materials and to personnel operating in tropical forest environments, and is examining the interaction of meteorological, hydrological, soils, vegetation and other biological factors in such environments. (Author)

AD-677 010/1 PC A14/MF A01
Smithsonian Institution, Washington, DC.
Ecological Study in Korea. Part I. A Cooperative Program for Ecosystem Research in Korea.
Final rept. Oct 66-Sep 68
Helmut K. Buechner, Edwin L. Tyson, and Ke Chung Kim. Sep 68, 311p AFOSR-68-2148
Contract F44620-67-C-0013
See also Part 2, AD-676 660.

Keywords: *Ecology, Southeast Asia, Education, Biology, Research program administration, Natural resources, *Plants(Botany), Personnel, Reports, Animals, Soils, Climatology, *South Korea, Demilitarized zones, Developing countries.

The program of 'Ecological Study in Korea' that was sponsored by the Smithsonian Institution and the Air Force Office of Scientific Research was initiated with the following objectives: (1) to provide a general description of the vegetation, animal life, soils, physiography, and climate of the study area; (2) to prepare appropriate vegetation and physiographic maps to accompany the descriptions; (3) to carry out a series of research projects of a preliminary nature on the physical characteristics, flora, and fauna of the study area by Korean scientists; and (4) to prepare a sound proposal for a long-range program to be submitted to granting agencies. (Author)

AD-679 182/6 PC A04/MF A01
Negev Inst. for Arid Zone Research, Beersheba (Israel). Dept. of Geobotany.
Use of Vegetation as an Indicator for Soil Properties under Desert Conditions.
Annual rept. no. 2, 1 Oct 65-1 Dec 66
Gideon Orshan, Uri Gavish, and Ilan Borovic. Mar 68, 67p
Contract DA-91-591-EUC-3806

Keywords: *Soils, *Deserts, *Plants(Botany), Classification, Thickness, Sand, Distribution, Clay, Physical properties, Climatology, Plant tissue, Water, Measurement, Israel, Summer, Negev Desert.

The report discusses the root systems in sandy deserts as related to soil properties. 13 leading species were excavated and described. These are classified in three types. Soil moisture was measured at two locations in the Negev desert during the summer of 1966 and its use by plants discussed. The effect of sand cover and irrigation on the competition between leading desert psamophtes was examined. (Author)

AD-679 459/8 PC A10/MF A01
National Research Council, Washington, DC. Foreign Field Research Program.
The Effects of African Agricultural Practices on Soil Productivity and Nutrient Levels in Kenya.
Final rept.
Paul L. Lehrer. Sep 61, 209p
Contract N00014-67-A-0244

Keywords: Rural areas, *Agriculture, Kenya, *Soils, Soil mechanics, Production, Nutrition, Deterioration, Fertilizers, Economics, Sociology, Structural geology, Climatology, Rainfall, Maps, Nutrients.

The purpose of this study is to examine the effects of African agricultural practices in Kenya on soil productivity. Emphasis is placed on discovering what effects cultivation would have on the nutrient levels of virgin soils in that country. It was found that fragmentation, female labor, and the attitude toward fertilization was actually more important than the more tangible physical considerations in understanding the basic characteristics of African agriculture. The deterioration of the physical condition of the soil through continuous cultivation perhaps is more responsible for a decreased productivity than is nutrient depletion. Only through sustained use of fertilizers can the productivity of Kenya soils be substantially increased. The economic future of the African farmer will depend upon his ability to obtain a higher income through the sale of cash crops. (Author)

AD-679 473/9 PC A08/MF A01
National Research Council, Washington, DC. Foreign Field Research Program.
Drained-Field Agriculture in Southwestern Tlaxcala, Mexico.
Final rept.
Gene C. Wilken. Sep 68, 155p
Contract N00014-67-A-0244

Keywords: Rural areas, *Agriculture, *Mexico, Climatology, Rainfall, Population, Soils, Drainage, Floods, Erosion, Irrigation systems, Deposition, Production, Reclamation, Ecology, Sociology, *Water Management, Tlaxcala(Mexico).

This study examines the land and water management problems of Tlaxcala, concentrating on the southwestern portion of the state which lies at the northern end of the Basin of Puebla on the Mesa Central of Mexico. To cope with poorly drained, sand-filled streamways which threaten flood and deposition on basin floor soils, the Tlaxcala farmers practice sophisticated land conservation and reclamation techniques, using a minimum of equipment. In the process, they have created a productive and distinctive agricultural region. A description of the methods they employ to maintain and expand the agricultural base in this difficult environment forms part I of this study. In part II, the ecology of farm life is discussed and the geographical relationship between complexes of agricultural practices, social systems, and populations is discussed. (Author)

AD-679 475/4 PC A12/MF A01
National Research Council, Washington, DC. Foreign Field Research Program.
A Philippine Sugar Cane District: Spatial Phenomena Affecting Sugar Cane Production on the Haciendas.
Final rept.
Norman W. Schul. Aug 62, 256p
Contract N00014-67-A-0244

Keywords: Agriculture, *Philippines, Statistical analysis, Climatology, Terrain, Management planning, Labor, Commerce, Rural areas, Machines, Regression analysis, Transportation, Industries, Soils, Production, Site selection, Maps, *Sugarcane.

The study primarily involves the analysis of physical and cultural factors affecting sugar cane yield although it will also further an understanding of the spatial organization of sugar cane production. The study is based on the Victorias Milling District, which covers approximately 37,000 hectares in northern Negros Occidental Province in the central Philippines. A simple model was used to describe the area's spatial organization of sugar cane production in the sphere of plantation agriculture. The model stipulates (1) an extensive land area, (2) mono-cropping, (3) centralized managerial control, (4) an abundant labor supply and (5) production for the export market. It has these further qualities which are believed to be comparable for most sugar cane districts in the Philippines: the characteristic hacienda-central settlements, the problems of mechanization, and the quota system for sugar cane. The yield factors studied were hacienda size, hauling distance from the hacienda to the mill, the slope, soil quality, the necessity for trucking, tenure, and the type of power used in land preparation. (Author)

AD-683 052/5 PC A02/MF A01
Army Biological Labs., Frederick, MD.
Portable Laboratory Kit for Water Testing under Field Conditions.
S. M. Drachev, and S. D. Zamyslova. 13 Mar 52, 5p
Rept no. Trans-654
Trans. of Gigiena i Sanitariya (USSR) v15 n7 p45-48 1950.

Keywords: Water supplies, Test equipment, Sanitary engineering, Laboratory equipment, *Instruments,

Portable, Chemical analysis, Rural areas, *USSR, *Water quality, Translations.

No abstract available.

AD-684 411/2 PC A02/MF A01
Naval Civil Engineering Lab., Port Hueneme, CA.
Bamboo Reinforced Concrete Construction.
Technical note
Francis E. Brink, and Paul J. Rush. Feb 66, 21p Rept no. NCEL-TN-808

Keywords: Naval research, *Reinforced concrete, Reinforcing materials, Fibers(Natural), Mixtures, Cements, Cracks, Moistureproofing, Mechanical properties, *Concrete, *Bamboo reinforced concrete.

This report has been prepared to assist field personnel in the design and construction of bamboo reinforced concrete. Comments on the selection and preparation of bamboo for reinforcing are given. Construction principles for bamboo reinforced concrete are discussed. Design procedures and charts for bamboo reinforced concrete are given and conversion methods from steel reinforced concrete design are shown. (Author)

AD-685 824/5 PC A07/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Expedient Reinforcement for Concrete for Use in Southeast Asia. Report 1. Preliminary Tests of Bamboo.
Technical rept.
Frank B. Cox, and Helmuth G. Geymayer. Feb 69, 139p Rept no. AEWES-TR-C-69-3-1

Keywords: *Reinforced concrete, Reinforcing materials, Reviews, Organic materials, Feasibility studies, Tensile properties, Bonding, Degradation, Aging(Materials), Beams(Structural), Loading(Mechanics), Life expectancy, *Concrete, *Bamboo reinforced concrete, Bamboo, Arundinaria tecta.

The report summarizes the preliminary results of a study of the feasibility of using bamboo as an expedient reinforcement for temporary, reinforced concrete structures. The report contains an extensive review of the literature, a description of the test procedures, results of an investigation of the most important engineering properties of bamboo, descriptions of tests of 26 bamboo-reinforced structural elements (20 simply supported beams with 6-ft (1.83-m) spans, and 6 simply supported two-way slabs of varying length, width, and depth), and conclusions and tentative recommendations for the design of bamboo-reinforced structures. (Author)

AD-686 717/0 PC A02/MF A01
Forest Products Lab., Madison, WI.
Preservative Treatments for Protecting Wood Boxes.
Forest Service research paper
A. F. Verrall, and T. C. Scheffer. Apr 69, 10p* Rept no. FSRP-FPL-106

Keywords: Wood, Protective treatments, *Containers, Preservation, Weatherproofing, Effectiveness, Storage, Exposure, Fungusproofing, Insects, Deterioration, Tropical regions, Life expectancy, *Wood preservatives, Dip treatments, Boxes(Containers).

An evaluation of the effectiveness of three-minute dip treatments in various wood preservatives for wood boxes stored off the ground for more than 10 years in both a southern and a northern climate. (Author)

AD-686 836/8 PC A04/MF A01
Arizona Univ., Tucson. Inst. of Arid Lands Research.
Inventory of Research on Desert Regional Types.
John R. Healy. 1968, 69p*
Contract DA-49-092-ARO-71
Chapter 9 of Inventory of Geographic Research on Desert Environments. See also Chapter 8, AD-668 853.

Keywords: *Deserts, Reviews, Scientific research, Classification, State-of-the-art reviews, Research program administration, Background, Geography, Environment, Terrain, Desert regional types, Annotated bibliographies.

The purpose of the inventory is to determine in detail what topics have been or are being investigated for the world's deserts, to appraise the reported work, and to disclose areas of study where further work is needed. The series of chapters does not attempt to recapitulate all information known about the deserts of the world, but rather comprises a compendium-guidebook to past and present research. It is based upon a critical review of the published literature augmented by consultations with specialists. (Author)

AD-687 318/6 PC A03/MF A01
RAND Corp., Santa Monica, CA.
The Organizational Approach Versus the Societal Approach to Development in Emerging Nations.
Paul T. McClure. May 69, 33p Rept no. P-4058

Keywords: Political science, *Management planning, Theory, Organizations, Sociometrics, Correlation techniques, Systems engineering, Problem solving, Decision making, Effectiveness, Developing countries, Public administration, Comparison.

Comparisons of public administrative systems on a national or regional level require much simplification, so that the descriptions and prescriptions which result may be too broad to be operational. The mission of the paper is to compare societal units with organizational units to determine which give a more appropriate focus point for analysis in order to achieve national development. (Author)

AD-688 132/0 PC A12/MF A01
Plastics Technical Evaluation Center, Dover, NJ.
Polyurethane Foams: Technology, Properties and Applications.
Arthur H. Landrock. Jan 69, 257p* Rept no. PLASTEC-37

Keywords: Isocyanate plastics, Expanded plastics, Expanded plastics, State-of-the-art reviews, Foams, Chemical properties, Manufacturing methods, Adhesives, Coatings, Bibliographies, *Foam plastics, Polyurethane foams.

This report discusses the state of the art of urethane foams. It includes a bibliography of over 700 references from the open literature, government project and contract reports, commercial bulletins, and conference papers. A detailed subject index and a number of other supplemental indexes are included. Topics covered are: chemistry of urethane foam process, types of foam, methods of manufacture, toxicity of raw materials, adhesives and other methods of joining, surface coatings, foam properties, test methods, military and space applications, comparative properties of other foams, specifications and standards, trade designations, and definitions of terms. (Author)

AD-701 167/9 PC A08/MF A01
Human Resources Research Organization, Alexandria, VA.
Planned Change in Agrarian Countries.
Technical rept.
Arthur H. Niehoff. Dec 69, 157p Rept no. HUMRRO-TR-89-21
Contract DAHC19-70-C-0012

Keywords: *Management planning, Rural areas, Culture, Social communication, Economics, Agriculture, Sociology, Agrarian countries, *Social change, Ethnic groups, Civic programs.

The report is an effort to provide operationally relevant concepts and guidelines for persons responsible for planning and implementing development projects in agrarian countries. A framework for describing or evaluating the conduct of development projects is proposed, and applied to the results of an analysis of 203 case studies of past projects. Influences, conditions, and techniques which appear to affect project outcome are: (1) local cultural characteristics, such as leader patterns, social structure, and economic patterns; (2) motivation for change, including felt needs and perceived practical benefits; and (3) project strategies, such as the innovator's image characteristics, communication, and participation. The case study analysis suggests that factors of special importance to success in development projects are cooperation of local leaders, degree and immediacy of practical benefits which recipients anticipate, innovator skill in communication processes, participation of recipients in implementing the change, and establishing arrangements for maintenance of the innovation by the local people. (Author)

AD-703 232/9 PC A19/MF A01
National Research Council, Washington, DC. Foreign Field Research Program.
Modernization in a Regional Context: Pretheory and Practice in Western Nigeria.
Final rept.
Thomas Harden Eighmy. Oct 69, 447p
Contract N00014-67-A-0244-0001
Prepared in cooperation with Wisconsin Univ., Madison, Dept. of Geography. Continuation of Contract Nonr-2300(09).

Keywords: Economics, *Nigeria, Reviews, Management planning, Environment, Agriculture, Commerce, Urban areas, Rural areas, Government(Foreign), Population, Roads, Communication systems, Factor analysis, Attitudes, Mathematical prediction, *Regional Planning, Modernization.

Modernization, viewed in a regional setting, is a process resulting jointly in areal integration and differentiation. A conceptual spatial model of modernization is proposed. The arguments developed are applied to Western Nigeria in relation to the location of agricultural production, the development of a system of periodic food markets, and the unequal modernization of the large preindustrial Yoruba towns. Measurement of the spatial aspects of modernization is achieved through the use of principal components analysis with components scores, regression analysis with residuals, and trend surface fitting. (Author)

AD-703 235/2 PC A17 MF A01
National Research Council, Washington, DC. Foreign Field Research Program.
The Milk Supply of Major Indian Cities.
Final rept.
Richard A. Ellefsen. 1964, 386p
Contract N00014-67-A-0244-0001
Continuation of Contract Nonr-2300(09).

Keywords: *Milk, Production, Urban planning, *India, Food, Problem solving, Economics, Rural areas, Production control, Bovines, Terrain, Organizations, Predictions, Management planning, Distribution, Demand(Economics), Delhi(India), Bombay(India), Madras(India), Calcutta(India).

The paper examines the milk industry in India in detail in order to point up its problems. The recent efforts towards improvement are assessed; an overview of the entire country is presented along with an intensive examination of the present and potential milk-supplying hinterlands for Delhi, Bombay, Madras, and Calcutta. Emphasis throughout the work is on the areal and locational aspects of the milk supply. (Author)

AD-703 278/2 PC A03/MF A01
RAND Corp., Santa Monica, CA.
The Philippine Family Planning Program: Some Suggestions for Dealing with Uncertainties.
John E. Koehler. Feb 70, 35p Rept no. RM-6149-AID
Contract F44620-67-C-0050

Keywords: *Philippines, *Population Control, Reproduction(Physiology), Control, Females, Public health, Education, Sociology, Statistical data, Attitudes, Demography, *Birth control.

Some tentative conclusions about family planning in the Philippines are presented. Using data from National Demographic Survey (NDS), the study investigated knowledge and use of birth control procedures among Philippine women by language, income, age, rate of use, information source, and use or nonuse. The study offers the following suggestions to designers of the AID family planning program in the Philippines: (1) to avoid explicit reference to some population growth rate as a formal program goal; (2) to examine the complex relationship between knowledge and use of contraceptive techniques; (3) to gather information from across the country rather than in depth from any single area or ethnic group; and (4) to use its leverage over the various agencies concerned to record experiences of individual women and to standardize recordkeeping. (Author)

AD-704 261/7 PC A04/MF A01
Forest Products Lab., Madison, WI.
Properties of Imported Tropical Woods.
Forest Service research paper
B. Francis Kukachka. Mar 70, 69p* Rept no. FSRP-FPL-125
Presented at the Conference on Tropical Hardwoods, State University College of Forestry, Syracuse Univ., 18-21 Aug 69.

Keywords: *Wood, Physical properties, Tropical regions, Classification, Machinability, Shrinkage, Flexural strength, Statistical data, Mechanical properties, Heartwoods, Sapwoods.

Descriptions are of more than 100 tropical genera and generic groups of wood are provided, with emphasis on properties that affect their utilization. Botanical names, common names, and principal growth areas are included. (Author)

AD-707 642/5 PC A02/MF A01
RAND Corp., Santa Monica, CA.
Communications Satellites, Technology Transfer, and Economic Development.
Paul L. Jordan. Jun 70, 13p Rept no. P-4347
Presented at AIAA Communications Satellite Systems Conference (3rd), Los Angeles, Calif. 6-8 Apr 70.

Keywords: Television communication systems, *Education, Economics, Communication satellites(Active), Mathematical analysis, *Television, *Technology transfer, Underdeveloped countries.

The use of educational television to improve the quality and quantity of education in developing countries is examined. A simple model relating economic development in emerging countries to education and the level of applied technology is presented. The use of television broadcast satellites as a means for improving education systems in developing regions is discussed in the context of competition for scarce resources and the requirement to concurrently develop educational software and infrastructure. (Author)

AD-709 715/7 PC A09/MF A01
Army Research Office, Research Triangle Park, NC.
Optimum Subsurface and Underground Shell Structures for Better Housing in Hot-Arid Lands. Part I: A Case for Subsurface and Underground Housing in Hot-Arid Lands. Part II: Optimization of Subsurface and Underground Shells.
Interim technical rept. no. 1
Sudhir Kumar, and Jason Cheng-Chuan Shih. Apr 70, 179p*
Research in Some Aspects of Fluid and Solid Mechanics.

Keywords: Underground structures, Structural shells, *Housing, Reviews, Construction materials, Numerical analysis, Tropical regions, Subsurface housing, Underground housing.

This report consists of two distinct parts. A case was made for subsurface and underground housing in hot-arid lands in Part I. This includes discussions of environmental conditions, past developments of subsurface housing, new conceptual designs for dwellings, apartments, complexes of large and multiple buildings and transportation tunnels, etc. Part II of the report presents analytical optimization of subsurface cylindrical shells and completely underground shells, with a view to keep at a minimum the quantity of material used in the shells. The subsurface cylindrical shells are optimized by limit analysis, whereas the optimum shape and thickness distribution of the underground shells is determined by elastic analysis. Shapes of several shells have been determined as examples and design charts for general use have been prepared for all these shells. (Author)

AD-709 718/1 PC A02/MF A01
Forest Products Lab., Madison, WI.
Natural Decay Resistance of 30 Peruvian Woods.
Forest Service research paper
T. L. Highley, and T. C. Scheffer. Jul 70, 6p* Rept no. FSRP-FPL-143

Keywords: *Wood, Fungus deterioration, *Peru, Tropical deterioration, Exposure, Damage, Wear resistance, Weight, Classification, Resistance(Biological), Statistical data, Test methods, *Fungi, Hardwoods, Decay resistant wood.

Thirty Peruvian species of possible commercial significance were evaluated by soil-block testing for resistance to decay fungi. The tests indicated that 25 percent of the species would be resistant or highly resistant for use in contact with the ground and that 50 percent of the species would be resistant or highly resistant for use above ground. Decay resistance was found to be substantially correlated with the specific gravity of the various species. (Author)

AD-713 201/2 PC A03/MF A01
Picatinny Arsenal, Dover, NJ.
Field Fabrication of Continuous Lightweight Reinforced Plastic Pipe. Phase I. Literature Search.
Technical rept.
Arnold E. Molzon. Jun 70, 29p* Rept no. PA-TR-4085

Keywords: Reinforced plastics, *Pipes(Tubes), Bibliographies, Curing agents, Polymerization, Ultraviolet radiation, Manufacturing methods, Abstracts, *Plastics, Plastic pipes, Linings.

A literature search has been made for references on field fabrication of reinforced thermoset plastic pipe for transporting military fuel. Sources searched include: Department of Defense, PLASTEC holdings, and the open literature. One hundred and eighteen abstracted references are listed, with an author index and subject index included. No references were found on actual production of reinforced plastic pipe in the field. Thirteen references are listed on continuous manufacture of reinforced pipe, fifteen on curing resins by ultraviolet, and eighteen on pipe linears. (Author)

AD-714 914/9 PC A09 MF A01
Army Foreign Science and Technology Center, Charlottesville, VA.
Excerpts from Treatments for Textile Materials.
P. A. Simigin, M. N. Zusman, and F. I. Raikhlin. 16 Jun 70, 186p Rept no. FSTC-HT-23-613-70
Trans. of mono. Zashchitnye Propitki Tekstilnykh Materialov, Moscow, 1957.

Keywords: *Cellulose, Fungus deterioration, Fungus proofing, Textiles, Fungicides, Moistureproofing, Fire resistant textiles, Manufacturing methods, Cotton textiles, Photochemistry, Microorganisms, Copper compounds, Chromium compounds, Test methods, Chromates, *USSR, *Textile industry, *Fungi, Tanning materials, Biodeterioration, Translations.

The book describes methods of treatment giving cellulose materials resistance to the effects of micro-organisms (to rotting), and giving fabric made of cellulose fibers water repellant and fire resistant properties, and also preventing the development of moths on silk materials. The book also presents modern methods of testing these treated materials. (Author)

AD-715 871/0 PC A07/MF A01
Duke Univ., Durham, NC.
Weight and Energy Values of Selected Litter-Fall Components from Two Forest Stands in the Canal Zone Republic of Panama.
Final rept. 5 May 67-4 Nov 70, 0 10 Frank W. / Woods
1970, 127p AROD-7382:2-EN
Grant DA-ARO(D)-31-124-G938

Keywords: *Forestry, *Panama, Plant tissue, Sampling, Weight, Trees, Deposits, Shrubs, Degradation, Energy, Moisture, Ecology, Site selection, Tropical regions, Forest litter, Vegetational decay.

Weights of selected plant parts and species composing litter fall were measured for more than one year in two forest stands in the Canal Zone. One stand was on the Caribbean side, the other on the Pacific. Seasonal values for kilograms and kilocalories per hectare were computed. (Author)

AD-718 400/7 PC A02/MF A01
Yale Univ., New Haven, CT. School of Forestry.
Properties of Tropical Woods.
Final rept.
Frederick F. Wangaard 31 Dec 69, 10p
Contract Nonr-609(13)

Keywords: *Wood, Physical properties, Military requirements, Boats, Aircraft, Piers, Adhesives, Density, Strength, Degradation, Laminates, Wood pulp, Naval research, Bibliographies, Tropical woods.

The research have been the basis for a series of Technical Reports -- 45 in number -- dealing with such diverse subjects as gluing characteristics, weathering characteristics, fiber-saturation point of wood, water-vapor sorption characteristics, mechanical behavior under sustained and repeated loading, decay resistance, wood properties affecting adhesion and glue-line behavior, the cutting of veneer, stabilizing effects of plastic overlays, properties of wood-core laminates, curvature-stress factor in laminated wood, fiber characteristics influencing pulp-sheet properties, factors influencing chemical resistance of wood, wettability of wood, and stress relaxation. (Author)

AD-716 740/6 PC A03/MF A01
Naval Research Lab., Washington, DC.
Biological Deterioration of Wood in Tropical Environments. Part 2. Marine Borer Resistance of Natural Woods over Long Periods of Immersion.
Final rept.
C. R. Southwell, J. D. Bultman, B. W. Forgeson, and C. W. Hummer. 7 Dec 70, 47p Rept no. NRL-7123
See also Part 1, AD-653 856.

Keywords: *Wood, Degradation, Tropical deterioration, *Marine borers, Resistance(Biological), Sea water, Identification, Tropical regions, Crustacea, Mollusca, Panama, Trees, Teredo, Pholad, Limnoria, Panama Canal Zone, Biological deterioration.

One hundred and fifteen wood species have been exposed to marine borers in three different tropical waters for periods up to 90 months. Underwater sites were in the Panama Canal Zone and included two oceans and a brackish-water lake. Over 30 species of marine-boring organisms were identified from these waters; their extreme activity in the warm tropical environments provided a very thorough screening test for the woods. Samples have been evaluated separately for resistance to the three principal borer classes--teredo, pholad, and limnoria. Several of the woods were resistant to one or more of the borer types. Some of these resistant species are relatively unknown as marine construction timbers, and in some instances they proved to be more durable than Greenheart, Teak, and other commercial marine woods. The species most resistant to all borers was Dalbergia retusa (Cocobolo), whose oily extract may provide leads to a satisfactory wood preservative. The woods most resistant to each of the different classes of borers are tabulated, with their respective silica content and density included. Silica was shown to be significant only in relation to teredine borers, while wood density was important only with pholads. Woods considered to be of special interest because of findings in the study are discussed individually. (Author)

AD-717 965/8 PC A07/MF A01
Bermuda Biological Station for Research, St. George's West.
Primary and Secondary Production in the Tropical Atlantic
Final rept. Aug 67-Sep 69
David M. Steven, Albert L. Brooks, and Euna A. Moore. Dec 70, 132p
Contract N00014-67-A-0432-0001
Prepared in cooperation with Bellairs Research Inst., St. James (Barbados), McGill Univ., Montreal (Quebec). Marine Sciences Centre, and University of the West Indies (Barbados). Dept. of Biology. See also AD-614 791.

Keywords: Ecology, Atlantic Ocean, Plankton, Salinity, Fertility, Nutrition, Sea water, Chemical properties, Chlorophylls, Aquatic animals, Periodic variations, *Aquaculture, Primary biological productivity, Biological productivity.

Forty-eight collections were made for a study of primary and secondary production at a station in 460 m of water, between 29 August 1967 and 1 September 1969, and 22 additional collections at 17 deep water stations within a radius of 100 miles from Barbados. Primary production by carbon fixation lacked seasonal variation and annual production was estimated at 117 g C /sq m/year. Predictable seasonal variations were also lacking in concentrations of nutrients and in the composition and quantity of phytoplankton and zooplankton. However evidence was obtained of oscillations with a two to four months' periodicity in the con-

centration of chlorophyll and the numbers of Trichodesmium, which is the most important phytoplankton of the surface waters. This is tentatively ascribed to a short term growth and decay cycle which may be determined by grazing by zooplankton. Additional information was obtained on an inverse correlation between salinity and silicate concentration in the surface water previously reported. The low salinity/high silicate water found off Barbados at various times from January to August appears to originate with the Amazon River outflow and is identified with the fresh water lenses some 500 miles to the east of the island. (Author)

AD-719 308/9 PC **A02/MF A01**
Forest Products Lab., Madison, WI.
Proposed Low-Cost Window Unit
Forest Service research note
B. G. Heebink. Jan 70, 7p Rept no. FSRN-FPL-0211

Keywords: Transparent panels, Design, Prefabricated buildings, Walls, Glass, Plywood, Manufacturing methods, Assembling, Construction materials, *Building materials, *Houses, Windows, Prefabrication.

The report presents a new concept of a window unit, designed primarily for low-cost houses. The proposed window has permanently mounted glass as the main unit, with a transom ventilating unit above. (Author)

AD-724 272/0 PC **A02/MF A01**
Forest Products Lab., Madison, WI.
Rapid Production of Pallet Deckboards from Low-Grade Logs
R. A. Hann, R. W. Jokerst, R. S. Kurtenacker, C. C. Peters, and J. L. Tschernitz. 1971, 18p* Rept no. FSRP-FPL-154

Keywords: Wood, Processing, Pallets, Production, Economics, Cutting, Standards, Quality control, Thickness, Drying, Laminates, Adhesives, Aging(Materials), Impact tests, Bending, Acceptability, *Wood products, Pallet deckboards, Hardwoods.

Low-grade red oak logs were made into satisfactory pallet deckboards in approximately 15 minutes by a process of rotary knife cutting, press drying, and gluing into the final product. Advantages, in addition to speed of processing, were the high yield from low-grade material, and an apparently acceptable end product. (Author)

AD-727 713/0 PC **A02** MF **A01**
Air Univ., Maxwell AFB, AL. Arctic, Desert, Tropic Information Center.
Plant Sources of Water in Southeast Asia
Aug 69, 11p Rept no. ADTIC-Information Bull-7-A

Keywords: *Plants(Botany), *Southeast Asia, *Water use, Sources, Instruction manuals, Survival, Identification, Site selection, Tropical regions, Tree.

Topics include: How to tap a tree; Cutting water vines; Descriptive data on thirst quenchers.

AD-730 939/8 PC **A03/MF A01**
Harvard Univ., Cambridge, MA. East Asian Research Center.
Production Brigade and Team Management
John C. Pelzel. 5 Oct 71, 35p AFOSR-TR-71-2624
Contract AF 49(638)-1399

Keywords: Management engineering, Production, *China, Rural areas, Agriculture, Labor, *Management techniques.

The report is based on case studies of management practices of twenty rural production teams belonging to one production brigade in southern Kwangtung and Fukien provinces. It describes the way in which Production Brigade and Teams were organized and managed, and the produce distributed. (Author)

AD-730 952/9 PC **A02/MF A01**
Forest Products Lab., Madison, WI.
Improvements in Solar Dry Kiln Design
Forest Service research note
Eugene M. Wengert. 1971, 10p Rept no. FSRN-FPL-0212
Prepared in cooperation with Wisconsin Univ., Madison. Master's thesis.

Keywords: *Wood, Driers(Apparatus), Solar radiation, Heat transfer, Design, Theses, *Solar drying.

The objective of this study was to identify the major energy losses in the solar dryer at Colorado State University, and then to suggest various design changes, based on theoretical considerations, to reduce these losses to leave more energy for the primary task of drying wood. (Author)

AD-731 719/1 PC **A04/MF A01**
California Univ., Berkeley. Structural Engineering Lab.
Solving the Galvanic Cell Problem in Ferro-Cement
Interim technical rept.
Kenneth A. Christensen, and Robert Brady Williamson. Jul 71, 67p Rept nos. UCSESM-71-14, TR-2
Contract N00014-69-A-0200-1007
Report on Structures and Materials Research.

Keywords: *Reinforced concrete, *Corrosion, Electrolytic cells, Cements, Steel, Reinforcing materials, Inhibition, Barrier coatings, Additives, Chromium compounds, Oxides, Construction materials, *Ferrocement, Galvanic corrosion, Chromium oxides.

The nature and constitution of ferro-cement is reviewed with special reference to the structure of cement paste. The microstructure of low water to-cement ratio pastes is presented in schematic illustrations to show that a thin paste layer can be used to protect steel reinforcing material from a marine environment. A galvanic cell between the plain steel reinforcing bar and the galvanized steel mesh ordinarily used in ferro-cement is identified. This galvanic cell gives off hydrogen gas at the plain steel reinforcing bar which leads to poor bonding. Possible solutions to this problem are presented and one, the use of chromium trioxide (CrO_3) in the mix water, is shown to solve the problem most effectively. This leads to improved mechanical properties as well as a sounder barrier to corrosion of the reinforcement. (Author)

AD-736 182/7 PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Biological Deterioration of Woods in Tropical Environments. Part 3. Chemical Wood Treatments for Long-Term Marine-Borer Protection
Final rept.
C. R. Southwell, and J. D. Bultman. 9 Dec 70, 32p Rept no. NRL-7345
See also Part 2, AD-716 740.

Keywords: Wood, *Marine borers, Environmental tests, Oceans, Tropical regions, Crustacea, Molluscacides, Creosote, Arsenic compounds, Copper compounds, Teredo, Pholad, Limnoria, Biodeterioration, *Wood preservatives, Copper arsenates, Pine wood, Fir wood.

Six chemical wood preservatives were selected for evaluation over long periods of exposure in extremely borer-active marine environments. Southern Yellow Pine and Douglas Fir were full-cell pressure-treated with these chemicals and exposed in tropical seas and tropical brackish water for periods up to 90 months. Subsequently, 16 of the natural tropical woods considered best for use with pressure preservatives were combined with whole creosote and exposed in the most borer active of the seawater sites for periods exceeding 4 years. All samples have been removed, sectioned, and rated separately for the three major groups of marine borers: teredo, pholad, and limnoria. The long-term results show that heavy treatments of whole creosote and chromated copper arsenate (CCA, type A) are very effective preservatives for Southern Pine exposed in seawater, while the CCA was the singularly most effective treatment against the brackish-water Psiloteredo. Some of the most promising results were obtained with combinations of a few relatively limnoria-resistant tropical woods with a teredo-effective creosote pressure treatment. (Author)

AD-736 268/4 PC **A03/MF A01**
Forest Products Lab., Madison, WI.
Wood Pallet Manufacturing
Forest Service research note.
1971, 38p* Rept no. FSRN-FPL-0213

Keywords: Wood, Pallets, Manufacturing methods, Design, Standards, Classification, Construction, Quality control, Military requirements, Moisture, Weight, Flexural strength, Compressive properties, Defects(Materials), Mechanical fasteners, Plywood, Adhesives, Economics, Production, *Wood products, *Industrial plants, Wood pallets, Wood pallet plants.

The report provides fundamental knowledge about wood, its characteristics, and fastenings as related to pallet design and production. Also discusses plant layouts and economics. (Author)

AD-740 374/4 PC **A05/MF A01**
Forest Products Lab., Madison, WI.
Comparison of Wood Preservatives in Stake Tests
Forest Service research note
L. Gjovik, and H. L. Davidson. 1972, 92p* Rept no. FSRN-FPL-02/72

Keywords: Wood, Protective treatments, Environmental tests, Deterioration, Fungusproofing, Isoptera, *Wood preservatives, Pine wood, Coptotermes formosanus, Formosan termites, Biodeterioration.

Reported are results on test stakes of southern pine sapwood 2 by 4 by 18 inches in size, treated by pressure and nonpressure processes, in decay and termite exposure in various climates. Also included in some of the tests are smaller pine stakes and those of treated and untreated plywood, modified woods, laminated paper plastic, and pine infected with Trichoderma mold. Preservatives such as coal-tar creosote and petroleum oils containing copper naphthenate, zinc naphthenate, phenyl mercury oleate, and pentachlorophenol have added a few months to 4 years to the life of the untreated stakes. Some waterborne preservatives have provided less protection to the stakes than the standard preservative oils. (Author)

AD-741 829/6 PC **A04/MF A01**
Human Resources Research Organization, Alexandria, VA.
Handbook of Small-Group Methods of Instruction
Research product
Joseph A. Olmstead. May 72, 71p Rept no. HumRRO-RP-D4-71-27
Contract DAHC19-70-C-0012

Keywords: Teaching methods, Handbooks, Management engineering, Problem solving, Instructors, Transfer of training, *Training, *Management training.

The handbook is designed to assist trainers and training managers to identify methods of instructing small groups (20 students or fewer) to accomplish desired instructional objectives. The emphasis is on methods and procedures rather than on rationale and theory. The material is presented in an outline form, for the trainer to adapt to his needs. Various methods, case discussions, and problem-solving and role-playing exercises are described. (Author)

AD-742 058/1 PC**$150.00**
Machinability Data Center, Cincinnati, OH.
Machining Data Handbook. Second Edition
1972, 1000p*
Contract DAAF01-70-C-0062, F33615-71-C-1112
Library of Congress catalog card no. 66-60051. Supersedes AD-636 106.

Keywords: Machining, Handbooks, Machinability, Cutting tools, Cutting fluids, Surface properties, Drilling, Grinding, Economics, *Machine tools, Automation, Standards, Vibration, Data, Numerical control.

Contents:
- Machining recommendations;
- Tool geometry;
- Cutting fluids;
- Tool materials;
- Surface finish and surface integrity;
- Guidelines for drilling;
- Machinability;
- Grinding and abrasive machining;
- Economics in machining;
- Vibrations, chatter, and machine tool dynamics;
- Numerical control and adaptive control;
- Machining standards;
- Supplemental machining information;
- Supplemental metallurgical information.

AD-742 271/0 PC **A04/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.

Stronger Concrete
Bryant Mather. Oct 66, 60p Rept no. AEWES-Misc-Paper-6-851

Keywords: *Concrete, Compressive properties, Construction materials, State-of-the-art reviews, Mixtures, Water, Aging(Materials), Loading(Mechanics), Cements, Costs, *Industrial plants, High strength concrete, Aggregates.

The report reviews production methods for producing high compressive strength concrete, and attempts to optimize the ratio of ingredients (with emphasis on minimum water content).

AD-743 436/8 PC A02/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Design, Analysis, and Construction of Precast Concrete Elements with Bamboo Reinforcement
Kenneth L. Saucier, and Eugene F. Smith. Sep 67, 20p Rept no. AEWES-Misc-Paper-6-926

Keywords: Structural parts, *Reinforced concrete, Wood, Loading(Mechanics), Design, Feasibility studies, Structural properties, Military engineering, *Bamboo reinforced concrete, *Concrete, Bamboo,

The purpose was to study the feasibility of using bamboo as the reinforcing material in precast concrete elements. The objectives were to: (1) determine the load-carrying capabilities and deflection limitations of precast concrete flexural elements with bamboo reinforcement under both short-term and sustained loads; and (2) modify current ultimate strength design and area-moment procedures, as necessary, so that ultimate moments and deflections of bamboo-reinforced concrete elements can be reasonably estimated. (Author)

AD-744 691/7 PC A03/MF A01
Forest Products Lab., Madison, WI.
FPL (Forest Products Laboratory) Designs Meet Family Housing Needs
Forest Service research paper
G. E. Sherwood. 1972, 30p* Rept no. FSRP-FPL-173

Keywords: Housing, Design, Construction, Construction materials, Wood, Foundations(Structures), Costs, Rural areas, Questionnaires, *Houses, *Wooden structures, Low cost housing, Rural housing.

The Forest Products Laboratory (FPL) has developed five house plans for low-cost rural houses to demonstrate cost-saving principles of construction. The plans feature simplicity of design, but provide structurally sound houses that fulfill the needs of many families. A questionnaire was mailed to 1,620 individuals who requested and were sent the FPL plans during 1969. A total of 1,129 responded. The replies indicated that 225 houses had been built and that 318 houses were planned for future construction. Ninety-three percent of the reported costs were less than $12,000; 92 percent indicated incomes of less than $7,000. In general, the survey results show that structurally sound houses can be built to meet the needs of low-income families at prices they can affort to pay. (Author)

AD-748 489/4 PC A02/MF A01
Northwestern Univ., Evanston, IL. Dept. of Biological Sciences.
Control of Flies and Cockroaches by Insect Hormones
Annual rept. no. 1, 1 Aug 71-31 Jul 72
Lawrence I. Gilbert. 10 Aug 72, 13p
Contract N00014-67-A-0356-0024

Keywords: Insect control, Hormones, Blattidae, Blood proteins, Chemical bonds, Labeled substances, Muscidae, Chromatographic analysis, Metabolism, Biochemistry, *Insects, Cockroaches, Juvenile hormones, Dopamine, Cuticle, Tanning materials.

The research described deals with two subjects; hormone receptors in insects and the tanning of the insect cuticle. If either process can be interfered with, one would have an effective means of insect control. Receptor studies using sucrose density gradient ultracentrifugation demonstrated the existence of two protein receptors in the crustacean hepatopancaeas that bind label from 3H-ecdysone (molting hormone). Microchemical analysis demonstrated that the label was now due to a previously undescribed ecdysone metabolite. Experiments with the lipoidal juvenile hormone showed that a specific hemolymph (blood) lipoprotein binds 14C-juvenile hormone. Using column chromatography, electrophoresis, and immunological procedures, the author has shown that 14C-dopamine (a central compound in tanning of the cuticle) is metabolized by two different routes in the tobacco hornworm. The immunochemical and radiotracer studies demonstrate for the first time that these hemolymph carrier proteins do indeed traverse the epidermal cell to make their way unaltered into the cuticle undergoing tanning. (Author)

AD-748 582/4 PC A03/MF A01
Naval Civil Engineering Lab., Port Hueneme, CA.
Flexural Strength of Ferro-Cement Panels
Technical rept.
J. E. Tancreto, and H. H. Haynes. Aug 72, 38p* Rept no. NCEL-TR-772

Keywords: *Reinforced concrete, Flexural strength, Panels(Structural), Steel, Wire, Reinforcing materials, Fracture(Mechanics), Composite materials, *Ferrocement.

The report studies ferro-cement panels reinforced with plain steel woven wire mesh and subjected to flexural loads to determine the first cracking, visible cracking, and ultimate strength properties. The reinforcement variables were mesh size (which ranged from 2 x 2 to 14 x 14 wires/in.), wire diameter (which ranged from 0.011 to 0.041 inch), and percentage of steel (which ranged from 1 to 3% by area in the direction of principal stress). Control panels of unreinforced mortar and panels reinforced with chicken wire or steel rods were also tested. (Author)

AD-750 351/9 PC A02/MF A01
Army Natick Labs., MA.
Disposal of Cellulosic Waste Materials by Enzymatic Hydrolysis
Mary Mandels, Lloyd Hontz, and Dixon Brandt. 1972, 16p*

Keywords: *Cellulose, Decomposition, *Enzymes, Cellulose, Disposal, Wastes(Industrial), Wastes(Sanitary engineering), Glucose, Hydrolysis, Production, Fungi, Cotton, Paper, Wood, Biodeterioration, *Waste disposal, Solid waste disposal, Celluloses, Bagasse, Rice hulls, *Agricultural wastes, Trichoderma viride.

The paper summarizes studies on pollution abatement by enzymatic conversion of waste cellulose to useful products. Cellulose is the major component of card board boxes, kraft paper, paper bags, correspondence paper, and newspring, or any other product of wood pulp or cotton. One approach has been the direct conversion of cellulose to animal protein by ruminant feeding, or to single cell protein by growing bacteria or fungi on cellulose. The authors' approach has been a different one. Cellulose was converted to glucose by acid or enzymatic hydrolysis.

AD-755 424/9 PC A03/MF A01
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Comparison Study of Aluminum, Ferro-Cement, and Fiber-Reinforced Plastic for Small Craft in Korea
Benjamin Whang. Dec 72, 37p Rept no. NSRDC-3979

Keywords: Hulls(Marine), Materials, *Aluminum, *Reinforced concrete, Reinforced plastics, Boats, Glass textiles, Polyester plastics, Physical properties, Costs, Abundance, Manufacturing methods, South Korea, Maintenance, *Boats, *Plastics, *Ferrocement, Fiber composites.

The work compares aluminum, ferro-cement, and fiber-reinforced plastic in terms of small boat construction costs, strength-stiffness/weight characteristics, maintenance, fatigue, impact resistance, fire resistance, etc. within the framework of present day Korean technology and economics. (Author)

AD-755 650/9 PC A16/MF A01
Defense Documentation Center, Alexandria, VA.
Ceramic Materials
Report bibliography Aug 54-Jun 72.
Feb 73, 357p* Rept no. DDC-TAS-72-83
Update of report dated Mar 69, AD-685 700.

Keywords: Ceramic materials, Bibliographies, Ceramic coatings, Bibliographies, Physical properties, Refractory materials, Processing, Manufacturing methods, High-temperature research, Electronic equipment, Alumina, Mechanical properties, Sintering, Composite materials, Piezoelectric transducers, Indexes, Abstracts, *Ceramics.

The bibliography contains unclassified and unlimited reports on ceramic materials. The following subtopics are covered: Processing and manufacturing of ceramic materials; Ceramic coatings; Physical properties of ceramic materials; High temperature applications of ceramic materials; and The use of ceramic materials in electronic devices. Indexes to Corporate Author-Monitoring Agency, Subject, Personal Author, and AD-Number are included. (Author)

AD-759 845/1 PC A05/MF A01
Advisory Group for Aeronautical Research and Development, Paris (France).
Government Assistance for Technical Information in Industry and Simple Mechanization for Small Information Centres
Conference proceedings.
1972, 99p* Rept no. AGARD-CP-117
Presented at Meeting of the AGARD Technical Information Panel, (25th) Ankara, Turkey, 23-24 Oct 72. NATO furnished.

Keywords: Technical information centers, Industries, Management engineering, Operation, Symposia, Dissemination, Automation, Government(Foreign), Data processing systems, Abstracts, Personnel, Training, Turkey, *Information services, Information transfer.

Contents:
- The present state of information activities in Turkey and future trends;
- Establishing small information centres in industry;
- Library and information services at the Royal Aircraft Establishment -- some problems and their present solutions;
- Training of personnel to man the various parts of an information centre and to operate various kinds of service;
- Microforms - present economics and future use;
- Problems of data recording and data interchange;
- Systemes d'entrees et de recherches pour des centres documentaires de faible ou moyenne importance;
- Presenting a development plan for approval;
- Tailored abstracts and technical digests - a service for industry;
- Information extension services for industry;
- The development and use of a modern data bank.

AD-760 718/7 PC A00/MF A00
Plastics Technical Evaluation Center, Dover, NJ.
Environmentally Degradable Plastics- A Review
Joan B. Titus. Feb 73, 22p* Rept no. PLASTEC Note-N24
Presented at the Picatinny Arsenal Technical Seminar Dover, N. J., 23 Feb 73.

Keywords: *Plastics, Decomposition, Reviews, Costs, Predictions, Photochemistry, Solubility, *Environmental impacts, Biodeterioration, Utilization, Water soluble polymers, Chemical reaction mechanisms.

Reviewed are mechanisms for degrading plastics capable of being of being degraded, companies and universities engaged in the degradation technology, costs, suggested applications, military problems with degradable plastics and the future outlook for degradable materials. (Modified author abstract)

AD-762 552/8 PC A03/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
Lime-Cement Combination Stabilization
Technical manuscript
Lovick P. Suddath. May 73, 40p Rept no. CERL-TM-M-47

Keywords: *Clays, Stabilization, Construction, Clay, Density, *Cement, Compressive properties, Wear resistance, Army research, *Roads, *Soil stabilization, Workability.

Soil stabilization is used extensively in road and airfield construction. In particular, soil-cement appears to be a favorite among the engineers. As the plasticity of a soil increases, the ability to adequately mix the cement with the soil becomes a critical factor. Also the quantity of cement required to stabilize the soil becomes excessive. The objective of the study was to determine the effect of reduced compacted density on the durability of cement stabilized clays, pretreated with lime. The reduction in density did not impair the durability of cement stabilized clay soils, which were pretreated with lime. Most of the test results indicated an improved resistance to freeze-thaw. An evaluation of the unconfined compressive strength results obtained during freeze-thaw shows that lime pretreatment improved the strengths. (Modified author abstract)

AD-764 294/5 PC A08/MF A01
Forest Products Lab., Madison, WI.
Veneer Species of the World
1973, 155p*

Keywords: *Wood, Reviews, Tables, Plywood, Trees, Sources, Veneers, Inventories.

The report is a compilation of veneer properties from several hundred wood species. Most of the data presented comes from research conducted in government laboratories in a half dozen nations. Additional information was obtained from contacts with the veneer and plywood industry. Presented are tables with the species by botanical name, common names, the name of the country supplying the data, and some of the properties of the wood.

AD-765 437/9 PC A08/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Aquatic Plant Control Program. Technical Report 4. Herbivorous Fish for Aquatic Plant Control
Final rept.
Edward O. Gangstad, Julian J. Raynes, Ralph M. Burress, John Stanley, and Kermit Sneed. Jun 73, 154p*
See also AD-750 500.

Keywords: Plants(Botany), Control, *Fishes, Pest control, Inland waterways, Ecology, Food, Removal, Efficiency, Digestive system, Nutrition, Test methods, Florida, *Aquatic plant control, Ctenopharyngodon idella, Herbivorous fishes, Aquatic weeds, *Weed control, Biological pest control.

During the last decade, research to discover means of controlling obnoxious aquatic plant growth has included evaluation of various species of herbivorous fishes. Two of the species studied, Israeli carp and the white amur fish, have shown sufficient efficacy to offer promise for utilization in controlling aquatic weeds in habitats occupied by established game fish populations. The Israeli carp was only effective in controlling filamentous algae and is useless for control of rooted aquatic plants. The white amur fish, on the other hand, has shown great promise in controlling submersed and emersed types of plants. The purpose of this research report was to determine the efficiency of the white amur fish (Ctenopharyngodon idella) as a biological control agent for aquatic weed populations in natural habitats, with evaluation of the effects of space and plant nutrients resulting from the destruction of weeds in the aquatic ecosystem. This research information provides the basis to establish a system of knowledge for control and operational procedures for use of white amur fish for aquatic plant control. (Author)

AD-765 616/8 PC A03/MF A01
Army War Coll., Carlisle Barracks, PA.
Administrative Aspects of Urbanization in Developing Countries
Monograph
Eugene R. Brady. 20 Mar 72, 31p

Keywords: *Management planning, Urban areas, Government(Foreign), Problem solving, Management engineering, Organizations, Dynamics, Urban planning, Reviews, Analysis, Natural resources, *Urban planning, Urbanization, Developing countries, Policies, Participative management.

The report deals primarily with administrative problems associated with urbanization in developing countries. Approaches to these problems are discussed in the following areas: organizational structures and relationships, management of resources, participation and representation, urban plans and policies, and institutional aids. (Author)

AD-765 702/6 PC E04/MF A01
Naval Postgraduate School, Monterey, CA.
Leadership through an Understanding of Human Motivation with Special Application to a Partially Industrialized Country
Master's thesis
Ali Saraf-Yazdy. Jun 73, 87p

Keywords. Leadership, Analysis, Motivation, Management control systems, Group dynamics, Classification, Psychometrics, Theory, Reviews, Theses, *Management techniques, Developing countries, Participative management, Human needs.

Management includes the functions of planning, organizing, directing, controlling and staffing. The function of directing includes the skill of leadership. A manager is charged with carrying out all of the functions of management. Some authorities have said that managers should be leaders but leaders need not be managers. There has been confusion concerning these terms because of their wide interchangeable use, and they are used interchangeably in this paper but for clarity when the terms manager or management are used they refer to that part of management which involves getting things done through people.

AD-767 566/3 PC A04/MF A01
Forest Products Lab., Madison, WI.
Principles for Protecting Wood Buildings from Decay
Forest Service research paper
T. C. Scheffer, and A. F. Verrall. 1973, 59p* Rept no. FSRP-FPL-190

Keywords: *Buildings, Wood, Protection, Preservation, Buildings, Degradation, Construction materials, Fungus deterioration Moisture, Foundations(Structures), Walls, Floors, Roofs, Impregnation, *Wood preservatives.

Problems caused by decay in buildings in the United States and the means to avoid or control them are dealt with in this work. The principal moisture situations and construction features most responsible for the occurrence of decay in various building parts are described, and directions are given for approximately modifying or eliminating undesirable conditions. Emphasis throughout is on the two primary means of protecting against decay: (1) The use of dry wood and of construction methods to keep wood dry, and (2) methods to treat wood with a suitable preservative in areas where dry conditions cannot be maintained.

AD-769 470/6 PC A19/MF A01
Army Foreign Science and Technology Center, Charlottesville, VA.
Glass Technology
L. M. Butt, and V. V. Pollyak. 28 Aug 73, 450p* Rept no. FSTC-HT-23-0660-73
Trans. of mono. Tekhnologiya Stekla, Moscow, 1971 367p.

Keywords: *Glass, Technology, Manufacturing, Melting, Production, *USSR, Translations, *Industrial plants.

The essentials of making glass and glass articles are examined. Properties of glasses and glass melts are discussed. Raw materials, their preparation, batch preparation, and the glassmaking process in various kinds of furnaces is described. Emphasis is placed on the production of sheet, polished, and architectural-structural glass, and slag pyroceramics. (Author) Portions of this document are not fully legible.

AD-771 198/9 PC A10/MF A01
Army Foreign Science and Technology Center, Charlottesville, VA.
Multifuel Diesel Engines
I. I. Gershman. 30 Oct 73, 221p Rept no. FSTC-HT-23-1981-72
Trans. of mono. Mnogotoplivnye Dizeli, Moscow, 1971 224p.

Keywords: *Diesel engines, Multifuel engines, Internal combustion engines, Diesel fuels, Fuel systems, Combustion, Translations, *USSR.

Soviet research and development in the field of creating multifuel motor vehicle diesel engines is described in detail. The authors considered their basic goal to be an analysis and evaluation of the possible technical solutions directed at adapting the internal combustion engine to operation on various types of fuels.

AD-771 344/9 PC E15/MF E15
Battelle Columbus Labs., OH. Metals and Ceramics Information Center.
Forging Equipment, Materials, and Practices
Final rept. 1 May 71-28 Feb 73
Taylan Altan, Francis W. Boulger, James R. Becker, Nuri Akgerman, and Harold J. Henning. Oct 73, 501p* Rept no. MCIC-HB-03
Contract F33615-71-C-1565, DSA9000-74-C-0616

Keywords: *Forging, Manufacturing, Forge presses, High energy rate forming, Dies, Mathematical analysis, Aluminum alloys, Automatic, Handbooks, Control, Beryllium, Cobalt alloys, Grain size, Heat treatment, Hydraulic presses, Titanium alloys, Magnesium alloys, Nickel alloys, Plastic deformation, Quality control, Quality assurance, Refractory metals, *Industrial plants.

The handbook provides design engineers with up-to-date information about the many aspects of forging including descriptions of important developments made more recently by industry and/or government. The handbook describes suitable measures for in-process quality control and quality assurance, summarizes relationships between forging practices and important mechanical properties and compares various forging devices to aid in equipment selection. Attention is also given to describing practices for relatively new materials and emerging forging practices. (Modified author abstract)

AD-771 700/2 PC A12/MF A01
Defense Documentation Center, Alexandria, VA.
Fungusproofing
Report bibliography Dec 43-Aug 72.
Dec 73, 265p* Rept no. DDC-TAS-73-72
Supersedes AD-720 202.

Keywords: Fungicides, Bibliographies, Fungusproofing, Moistureproofing, Weatherproofing, Plastics, Textiles, Microorganisms, Coatings, Fungus deterioration, Paper, Composition board, Wood, Humidity, *Fungi.

The bibliography is a collection of references relating to fungusproofing as it pertains to industrial processing. The process of weatherproofing, coating, moistureproofing, fungus deterioration, and fungicides are discussed. Corporate Author-Monitoring Agency, Subject, Title, and Personal Author indexes are included. (Author)

AD-772 930/4 PC A02/MF A01
Army Natick Labs., MA.
The Acceptability of Whey-Soy Mix as a Supplementary Food for Pre-School Children in Developing Countries
Technical rept.
W. I. III Rodier, W. C. Wetsel, H. L. Jacobs, R. C. Graeber, and H. R. Moskowitz. Dec 73, 21p* Rept no. USA-NLABS-TR-74-20-PR

Keywords: *Milk, Food, *Children, Acceptability, *Beverages. Army research, Developing countries.

Testing of a whey-soy beverage powder was carried out in Chile, Vietnam, India, Pakistan, Sierra Leone and the Dominican Republic to determine its probable acceptability for use as a supplementary food for preschool children. Test results indicated that the beverage powder should be acceptable in all test countries except possible Sierra Leone. Moreover, since the tests were carried out in a variety of geographical areas and cultures and in several types of distribution systems, it may be concluded that there is a high probability that the beverage powder will be acceptable in pre-school child feeding programs in most parts of the developing world.

AD-774 720/7 PC E01/MF A01
California Univ., San Francisco. George Williams Hooper Foundation.

The Biological Control of Schistosomiasis: A Program to Develop Use of Trematode Interactions in the Snail Host in Conjunction with the Molluscicide Endod as a New Approach to the Control of Human Schistosomiasis in Egypt and Ethiopia
Final rept. Aug 72-Oct 73
Donald Heyneman, and Harry G. Lee. 31 Dec 73, 33
Contract N00014-69-A-0200-2005

Keywords: *Schistosomiasis, Trematodes, Gastropoda, Schistosoma, Parasitic diseases, Parasites, Molluscacides, Egypt, Ethiopia, *Pest control, *Diseases, Biological pest control, Echinostomata, Host parasite relations.

A series of 25 field stations were established from which 4000 snails were collected. These snail hosts serve as hosts of both of the endemic schistosome species (Schistosoma haematobium from Bulinus truncatus, Bu. abyssinicus, Bu. sericinus, and Bu. forskalii; and S. mansoni from Biomphalaria pfeifferi) and a number of possible trematode antagonists among the echinostome species found parasitizing these snails. About 75 collections of cercariae were made and analyzed. A species of 43-spined Echinoparyphium proved to be a widespread parasite in the various forms of Bulinus collected both in Ethiopia and Egypt. Efforts to develop this species as a biological control of S. haematobium are underway. Factors required for successful biological control are described and discussed.

AD-775 408/8 PC A08/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Aquatic Plant Control Program. Technical Report 6. Biological Control of Water Hyacinth with Insect Enemies
Final rept.
Edward O. Gangstad, Julian J. Raynes, Charles F. Zeiger, Jean M. Ingersoll, and Robert D. Gordon. Jan 74, 156p*
See also report dated Oct 73, AD-769 583.

Keywords: Aquatic plants,*Aquatic weeds, Beetles, Control, Ecology, Coleoptera, Insects, *Aquatic plant control, *Water hyacinth, Neochetina eichhorniae, Biological weed control, *Weed control.

Present water hyacinth control programs provide at best only short-term control, and thus are of short-term benefit as far as productivity of the environment is concerned, whereas successful biological control will provide long-term benefits to productivity, with a concomitant reduction in the use of chemical or mechanical disturbances of the environment. Once a biological control agent is established, it becomes an integral part of the environment and as such may properly be considered a self-renewable resource, and a beneficial addition to our environment. It is a hope that Neochetina eichhorniae will prove to be just that, and that it will, alone or in conjunction with other native or introduced natural enemies, bring about the alleviation of the problems caused by water hyacinth in the southeastern United States. (Author)

AD-777 404/5 PC A02/MF A01
Naval Medical Research Unit No. 2, Manila (Philippines).
Abstracts of Papers Presented by Staff of NAMRU-2 at the International Congress of Tropical Medicine and Malaria (9th), Held in Athens (Greece) on 14-21 October 1973
Jan 74, 5p Rept no. NAMRU-2-IR-32

Keywords: Meetings, Parasitic diseases, Tropical diseases, Greece, Abstracts, Trematodes, Helminthic diseases, *Schistosomiasis, Filariasis, Nematoda, Indonesia, Disease vectors, Hosts(Biology), Parasites, *Malaria, *Diseases, Fasciolopsis buski, Capillaria philippinensis, Echinostomiasis lindoensis.

Contents:
- Results of skin testing for trematode infections on Taiwan;
- The in vitro cultivation of Fasciolopsis buski (Lankester);
- Antigen analysis of Fasciolopsis buski (Lankester);
- Schistosomiasis in Indonesia, ecological and zoonotic aspects;
- Filariasis in transmigration settlements of Indonesia;
- Zoonotec aspects of Capillaria philippinensis;
- Mammals and their parasites in Gumbasa Valley, Central Sulawesi, Indonesia;
- Schistosomiasis in Indonesia, human aspects;
- Echinostomiasis lindoensis: a disease that disappeared.

AD-778 156/0 PC$4.50/MF$3.00
Construction Engineering Research Lab. (Army), Champaign, IL.
Foundations for Family Housing
Final rept.
J. E. Bowles. Apr 74, 109p* Rept no. CERL-TR-D-20

Keywords: *Housing, Foundations(Structures), Sites, Soil science, Superstructures, Structural mechanics, Environmental engineering, Cost analysis, *Soils.

The report presents in abbreviated form information necessary to select appropriate foundations for family housing for various site conditions, climates, and construction methods. Included are a comprehensive survey of foundations presently used for family housing, a review of the soil mechanics used in foundation design, a discussion of current forms of house construction, and examples of cost computations for some typical foundations. Also included are several tables which facilitate the selection of an appropriate foundation type. (Author)

AD-778 846/6 PC A21/MF A01
Informatics, Inc., Rockville, MD.
Solar Energy
Vlastimir A. Stevovich. 1 Mar 74, 478p* AFOSR-TR-74-0600
Contract F44620-72-C-0053, ARPA Order-1622-4

Keywords: *Solar energy, Energy conversion, Power, Energy, Energy storage, Collection, Solar heating, Utilization, USSR, Power supplies, Reviews.

The report is a comprehensive review of present major developments and future planning in various fields of applied solar engineering. The study covers theoretical and experimental data on the background and state-of-the-art of applied solar research in general, with emphasis on foreign work, particularly in the Soviet Union. (Author)

AD-780 061/8 PC A06/MF A01
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
How to Obtain Information in Different Fields of Science and Technology: A User's Guide
Lecture series.
1974, 124p* Rept no. AGARD-LS-69
NATO furnished.

Keywords: Information centers, Information processing, Information, Flow, Global, Distribution, *Information sources, Information dissemination, Lectures.

The purpose of the series is to outline for the user of information systems the principles upon which such systems are based, and thus enable him to understand and more readily exploit their potentialities. The series includes presentations of general information on this subject and more detailed examples of specific scientific, medical and governmental systems.

AD-781 403/1 PC E05/MF A01
Naval Postgraduate School, Monterey, CA.
Fatigue of Ferro-Cement
Master's thesis
Michael G. Simpson. Jun 74, 119p

Keywords: *Reinforced concrete, Fatigue(Mechanics), Ship hulls, Stresses, Test methods, Fracture(Mechanics), Electron microscopy, Theses, *Ferrocement, Wire cloth, Scanning electron microscopy.

Ferro-cement is a cement mortar with a high relative volume of well dispersed steel wire reinforcement. The material properties of ferrocement are neither those of the mortar alone nor of the reinforcement and vary as the mortar and reinforcement configurations are changed. In this study, several variations of ferrocement were fabricated and subjected to constant amplitude cyclic loads up to ten million cycles. Stress versus cycles-to-failure plots were developed and comparisons between the data for various ferrocement modifications were made. Monotonic tests were conducted on the ferro-cement to allow comparisons with work conducted by other experimenters. An investigation of the fracture surface was conducted using a scanning electron microscope. (Author)

AD-782 199/4 PC A04/MF A01
Asian Inst. of Tech., Bangkok (Thailand).
Investigation of Rational Effluent and Stream Standards for Tropical Countries
Annual rept. 1 Nov 71-30 Apr 73
Mainwaring B. Pescod. 28 May 74, 61p ARDG/FE-476-2
Grant DA-RDRF-S92-544-72-G179

Keywords: *Water pollution, *Water supply, Streams, Southeast Asia, Standards, Quality, Irrigation systems, Sewage treatment, Drinking water, Oxygen, Fishes, Oxidation, Waste water, Costs, Thailand, *Water quality, Water quality standards, Oxidation lagoons, Developing countries.

Water quality standards were reviewed and tentative stream standards proposed for use in developing countries of Southeast Asia on the basis of legitimate water uses and adaptation of available data to local conditions. A survey of stream standards and water uses applied in the Southeast Asian region indicated that few countries had adopted standards and practically no attempt had been made to adjust to suit local conditions. Experimental studies suggested that oxidation pond effluent would have a beneficial effect on the oxygen balance of a stream under tropical conditions provided that the algal concentration was not more than 10,000 cells/ml after dilution in the stream. Oxidation ponds were assessed as being more attractive than either trickling filter or activated sludge treatment plants for populations less than 175,000 and land rental costs of U.S. $0.10 per square meter per year or less. (Author)

AD-784 092/9 PC A03/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
The Use of Coral as an Aggregate for Portland Cement Concrete Structures
Final rept.
P. A. Howdyshell. Jun 74, 43p* Rept no. CERL-TR-M-88

Keywords: Construction materials, *Coral, *Concrete, Construction, Structures, Deterioration, Military engineering, Pacific Ocean Islands, *Cement, *Aggregates(Materials), Evaluation.

The investigation documents the experience gained by the Corps of Engineers and the Navy since World War II in the use of coral as an aggregate for portland cement concrete. The approach was to evaluate relevant literature and construction and inspection records, visit construction and material preparation sites, evaluate existing coral concrete structures, and analyze coral aggregate and coral concrete samples in the laboratory. The results of the investigation indicate that coral has successfully been used as an aggregate for concrete in vertical construction. The only significant type of deterioration observed in coral concrete structures was the cracking and spalling of concrete associated with corroding reinforcing steel. The severity of the corrosion-spalling problem was sufficient in some cases to affect structural integrity, while in other cases little or no deterioration was observed. For the most part specifications and construction techniques currently being used for production of coral aggregate and coral concrete are similar to specifications and techniques for conventional aggregate and concrete. (Author)

AD-784 557/1 PC A03/MF A01
Forest Products Lab., Madison, WI.
Properties of Particleboards at Various Humidity Conditions
Forest Service research paper
J. Dobbin McNatt. 1974, 26p* Rept no. FSRP-FPL-225

Keywords: *Fiberboard, *Wood, Humidity, Stresses, Moisture, Flexural strength, Elastic properties, Compressive properties, Bending, Loads(Forces), Exposure(General), Degradation, Stiffness, Drying, Tables(Data), *Particle board, Design.

The changes in properties of particleboard that result from changes in moisture content should be determined to avoid possible problems related to linear expansion and thickness swelling and to loss in load-carrying capacity and stiffness. In this report the physical and mechanical properties are determined for five commercial particleboards manufactured primarily from planer shavings and for a board made at the Forest Products Laboratory from random-width Douglas-fir flaxes, 1 inch long and 0.015 inch thick. All were conditioned at humidity exposures between ovendry and 90 % relative humidity. (Modified author abstract)

AD-784 565/4 PC$3.00/MF$3.00
Forest Products Lab., Madison, WI.
Basic Properties of Three Medium-Density Hardboards
Forest Service research paper
Michael J. Superfesky, and Wayne C. Lewis. 1974, 7p Rept no. FSRP-FPL-238

Keywords: *Fiberboard, *Wood, Panels, Bending, Heating, Quality, Compressive properties, Flexural strength, Tension, Hardness, Test methods, Moisture, Expansion, Wood wastes, Hardwoods, Evaluation.

To provide a base for comparison with experimentally produced boards from urban residues and other raw materials, the basic properties of three commercial medium-density hardboards were evaluated. The report presents properties obtained in flexure, tension parallel to surface, compression, tension perpendicular to surface (internal bond), hardness, and screw withdrawal as well as physical properties such as water absorption, thickness swelling, and linear expansion. (Modified author abstract)

AD-785 748/5 PC A03/MF A01
Trinity Coll., Dublin (Ireland). School of Engineering.
Investigation of Stress Concentration in Reinforced Concrete Components
Final technical rept. 1 Jun 73-31 May 74
T. E. Glynn, and M. Z. Al-Salihi. Jun 74, 26p
Grant DA-ERO-591-73-G-0041

Keywords: *Reinforced concrete, Stresses, Static tests, Dynamic tests, Crack propagation, Formulations, Ireland, *Ferrocement.

This report is a continuation of the former efforts to elucidate the behavior of ferrocement concrete in static and dynamic stress fields. The influence of various reinforcements on pre and post cracking of thin sections forms the main topic of this report. The objects of the testing program were to compare the effectiveness of various steel mesh configurations in arresting crack propagation in stressed members; to provide experimental data for checking theoretical predictions of strength based on material parameters; to identify areas of future research potential. The work to date has been devoted to flexural and direct tensile tests on thin slabs. The slabs were reinforced uniformly with steel meshes of various patterns. The matrix consisted of microconcretes, and some variations in the mix design were incorporated.

AD-785 928/3 PC A03/MF A01
Romualdi (James P.), Pittsburgh, PA.
Ferrocement Developments in New Zealand
James P. Romualdi. May 74, 36p
Contract N00167-74-C-0171

Keywords: Ship hulls, *Boats, Cements, Production, New Zealand, *Ferrocement.

During the period August 1973 to January 1974, the author was associated with a local firm which is engaged in marine and terrestrial ferrocement activities. These activities provided an opportunity to assess the potential of ferrocement as well as the undertaking of tests of new hull construction techniques that combine ferrocement with steel fiber reinforced mortar. This report summarizes current development, assesses current potential of the material, presents the results of the test series, and ends with recommendations for future development. This report does not attempt to review the general state-of-the-art of ferrocement hull construction.

AD-787 465/4 MF A01
Department of the Army, Washington, DC.
Africa: A Bibliographic Survey of Literature
1973, 623p* Rept no. DA-PAM-550-17

Paper copy available from GPO.

Keywords: *Africa, Bibliographies, Handbooks, Political science, Sociology, Economics, Military forces(Foreign), Military organizations, Transportation, Communication and radio systems, Literature surveys, *Socioeconomic status, Developing countries.

Like the previous volume on the subject (DA PAM 550-5) which was issued in April 1967, the new edition endeavors to assess the problems and prospects in the vast continent. The difficulties and accomplishments are looked at from both--a broad, regional point of view, as well as from a specific, national point of view. The work includes data on the strategic importance of Africa as a continent, and also provides facts and figures on the political, sociological, economic, and military aspects that contribute to the viability of individual African states. More than four thousand books, periodical articles, and monographs, were searched in the preparation of this work. The body of material is supported by 91 appendixes and 53 maps, of which 18 are in color.

AD-863 643/3 PC A03/MF A01
Fort Detrick, Frederick, MD.
Peanut Rust: A Review of Literature
Kenneth R. Bromfield. Dec 69, 26p Rept no. SMUFD-Misc Pub-36
Distribution Limitation now Removed.

Keywords: Puccinia(Rusts), Reviews, *Plants(Botany), Diseases, Pathology, Fungi, Life cycle, Epidemiology, Control, Central America, Caribbean sea, South America, United States, *Plant diseases, *Peanuts, Puccinia arachildis, Arachis hypogaea.

On plants subjected to early and intensive rust attack, leaves fail to attain normal size and fall to the ground prematurely, growth of the shoot is slowed, the life cycle of the plant may be shortened by more than 15 to 20 days, and the seeds that are produced may be smaller and lower in oil content. (Author)

AD-878 076/6 PC A03/MF A01
Naval Ship Research and Development Lab., Annapolis, MD.
State-of-the-Art Survey of Ferrocement
Research and development rept.
Frank E. Brauer. Jan 71, 38p Rept no. NSRDL/A-8-529
Distribution limitation now removed.

Keywords: Cements, *Reinforced concrete, Composite materials, Construction materials, Ships, Wire, Reinforcing materials, Tensile properties, Flexural strength, Modulus of elasticity, Fatigue(Mechanics), Compressive properties, Shear stresses, Corrosion resistance, Impact shock, Mechanical properties, Shock resistance, State-of-the-art reviews, Cracks, Ductility, Steel, Bonding, Corrosion inhibition, *Ferrocement, Portland cement.

From this literature study it was found that ferrocement is a composite material of superior mechanical properties when compared to reinforced concrete. This superiority is reflected in greater flexural crack strength, tensile strength, ductility, and impact strength. Much more research into the material properties of ferrocement must be done to fully understand the nature of the strengthening mechanism in ferrocement and to provide designers with comprehensive, reliable information necessary for the maximum utilization of ferrocement. (Author)

ALO-71 PC A12/MF A01
Sandia Labs., Albuquerque, NM.
Summary of Photovoltaic Application Experiments Designs
E. L. Burgess, and E. A. Walker. Oct 79, 251p

Keywords: *Photovoltaic power system, Meetings, Demonstration programs, Leading abstract, Uses.

Separate abstracts were prepared for the 29 papers presented. (ERA citation 05:009861)

ANL/CNSV-TM-61 PC A03/MF A01
Argonne National Lab., IL.
Potential Health and Safety Impacts from Distribution and Storage of Alcohol Fuels
S. E. Rosenberg, and J. R. Gasper. Jun 80, 33p
Contract W-31-109-ENG-38

Keywords: Alcohol fuels, Accidents, Chemical explosions, Chemical spills, Energy policy, *Alcohols, *Gasohol, *Fire safety, *Health, Ethanol, Fires, Gasoline, Health hazards, Ingestion, Inhalation, Methanol, Petroleum industry, Risk assessment, Safety, Skin absorption, Standards, Storage, Toxicity.

This assessment includes three major sections. Section 1 is a synopsis of literature on the health and safety aspects of neat alcohols, alcohol-gasoline blends, and typical gasoline. Section 2 identifies the toxic properties of each fuel type and describes existing standards and regulations and suggests provisions for establishing others. Section 3 analyzes the major safety and health risks that would result from the increased use of each type of alcohol fuel. Potential accidents are described and their probable impacts on occupational and public populations are determined. An attempt was made to distill the important health and safety issues and to define gaps in our knowledge regarding alcohol fuels to highlight the further research needed to circumvent potential helth and safety problems. (ERA citation 06:024416)

ANL-79-15(Ed.2) PC A17/MF A01
Argonne National Lab., IL.
Design and Installation Manual for Thermal Energy Storage
R. L. Cole, K. J. Nield, R. R. Rohde, and R. M. Wolosewicz. Jan 80, 381p
Contract W-31-109-ENG-38

Keywords: Phase change materials, *Solar heating systems, Solar water heaters, Thermal energy storage equipment, Auxiliary heating, Blowers, Concretes, Construction, Cost, Data, Design, Draft control systems, Fiberglass, Heat exchangers, Heat losses, Heat transfer fluids, Installation, Latent heat storage, Manuals, Performance, Physical properties, Plastics, Pressure drop, Pumps, Rock beds, Safety, Safety engineering, Size, Specific heat, Specifications, Steels, Stratification, Tanks, Temperature monitoring, Thermal insulation, Valves, *Solar water heating.

The purpose of this manual is to provide information on the design and installation of thermal energy storage in active solar systems. It is intended for contractors, installers, solar system designers, engineers, architects, and manufacturers who intend to enter the solar energy business. The reader should have general knowledge of how solar heating and cooling systems operate and knowledge of construction methods and building codes. Knowledge of solar analysis methods such as f-Chart, SOLCOST, DOE-1, or TRNSYS would be helpful. The information contained in the manual includes sizing storage, choosing a location for the storage device, and insulation requirements. Both air-based and liquid-based systems are covered with topics on designing rock beds, tank types, pump and fan selection, installation, costs, and operation and maintenance. Topics relevant to latent heat storage include properties of phase-change materials, sizing the storage unit, insulating the storage unit, available systems, and cost. Topics relevant to heating domestic water include safety, single- and dual-tank systems, domestic water heating with air- and liquid-based space heating systems, and stand alone domestics hot water systems. Several appendices present common problems with storage systems and their solutions, heat transfer fluid properties, economic insulation thickness, heat exchanger sizing, and sample specifications for heat exchangers, wooden rock bins, steel tanks, concrete tanks, and fiberglass-reinforced plastic tanks. (ERA citation 05:018778)

ATR-78(7384)-1 PC A17/MF A01
Aerospace Corp., El Segundo, CA.
Utilization of Used Oil. Final Report
G. J. Mascetti, and H. M. White. Aug 78, 396p
Contract EY-76-C-03-1101-003

Keywords: Waste oils, Combustion, Economics, Energy accounting, Energy conservation, Lubricating oils, Refining, Waste product utilization, Liquid wastes, *Waste recycling, *Oil, *Lubrication.

This report assesses the potential impact of re-refining used automotive and industrial lubricating oils on the national petroleum consumption. The technical base for this assessment is derived from a comprehensive review of the processes utilized in re-refining used oil

and those processes used to produce lube oil from crude. Both existing and recently proposed processes are considered. Additionally, an extensive review of processes described in the patent literature is provided. Re-refining processes are surveyed and evaluated. Process descriptions are provided; hardware is identified; and process energy and economic requirements are calculated. Factors affecting the profitability of a re-refining operation are discussed. Economic projections of the demand for lube oil and the ability to satisfy this demand from crude oil are made and the value of lube oil as a vital resource and the need for conservation are addressed. Other factors related to re-refining are discussed, including lube oil characteristics, degradation, lube oil quality and engine sequence testing, and legislative and institutional barriers. Finally, an energy assessment of used oil utilization is made. Two options are considered in this assessment: (1) all used oil is re-refined and recycled back to lube oil; (2) all used oil is burned to recover its heat content. (ERA citation 04:035786)

***B-279 771/0** PC **A02**
North Carolina State Univ., Raleigh. Sea Grant Coll. Program.
The $6-Million Eel, or from Bait to Delicacy in Four Years
Karen M. Jurgensen, and Gene Crow. 1977, 8p
UNC-SGR-115, NOAA-78032008

Keywords: Eels, Aquaculture, Economic development, Harvesting, Prices, Demand(Economics), North Carolina, *Fishes, Sea Grant program.

In five years, the University of North Carolina Sea Grant College Program has spent less than $75,000 on wild eel harvesting advisory services. What started out as an effort to tap an underutilized species has led to an increasingly sophisticated and expanding industry--one which promises even further development. There is a potential market now for eels of all sizes. Extensive worldwide demand continues, prices are good, supplies are down elsewhere. To have created a market would have taken a lot longer if, indeed, it could have done at all. The project has lived up to its goals. It has improved the financial situation of at least 350 fishermen and a number of businesses. It promises to do more.

BMFT-FB-T-77-06 PC **A04**/MF **A01**
Dornier-System G.m.b.H., Friedrichshafen (Germany, F.R.).
Glue Stock from Leather Production. Final Report
K. Purps. Jul 77, 55p
U.S. Sales Only.

Keywords: Industrial wastes, *Leather, Economics, Environmental effects, Processing, Recycling, Waste processing, *West Germany, Solid waste disposal, *Waste recycling, Hides.

The low-collagen, limed inner hide layer obtained in tanneries is not recommended for reuse in the hide gluing industry both from the economic and the environmental standpoint. Therefore, it is proposed to have the flesh removed from the unlimed raw hide in the slaughterhouses. The tanneries are thus relieved of their burden of waste discharge, and the animal carcass-rendering companies can benefit from an additional valuable raw material. (ERA citation 03:031271)

BMI-1957(V.3) PC **A09**/MF **A01**
Battelle Columbus Labs., OH.
Systems Study of Fuels from Sugarcane, Sweet Sorghum, and Sugar Beets. Volume III. Conversion to Fuels and Chemical Feedstocks. Task 77. Final Report
E. S. Lipinsky, R. A. Nathan, W. J. Sheppard, and J. L. Otis. 31 Dec 76, 183p
Contract W-7405-ENG-92

Keywords: *Ammonia, Chemical feedstocks, *Ethanol, Furfural, *Sugarcane, Acetic acid, Acid hydrolysis, Anaerobic digestion, Bagasse, Biosynthesis, Comparative evaluations, Cost, Economics, Fermentation, High btu gas, Industrial plants, Liquids, Residues, Thermochemical processes, *Sorghum, *Sugar beets, Refuse derived fuels.

Information developed in field interviews and literature research which form the basis of extensive calculations that pertain to numerous alternative means of converting the sugar crops into fuels and chemical feedstocks is reported. Investigation of numerous candidate fuels and chemical feedstocks that might be made from sugar crops indicates that ethanol and ammonia are the most promising. The projected cost of ethanol by use of well-established fermentation technology on juice extracted from sugarcane or on molasses is expected to be quite close to that projected for ethanol from natural gas liquids or petroleum by 1980. The ammonia market is substantial (17 million tons), but this key fertilizer and chemical product is expected to cost close to $200 per ton when made from sugar crop residues, well above what ammonia made from natural gas at $3 per million Btu costs. However, sugarcane-based ammonia might compete well with coal-based ammonia. Sugarcane appears to be the most promising sugar crop for conversion to fuels and chemicals in the short and intermediate term. The costs of sugarcane juice and bagasse are lower than for the corresponding sugar beet products. Of the sugar crops, sweet sorghum has the greatest long-range appeal for the United States because the crop can grow over a much wider geographical range than can sugarcane. The development of processes to manufacture ammonia, methanol, acetic acid, and thermochemical substitute natural gas (SNG) from sugar crop residues depends on technology to generate synthesis gas. Sugarcane bagasse appears to be the most economic source of furfural. Anaerobic digestion of sugarcane or sugar-containing juices to SNG is ruled out on economic grounds. The principal findings of the conversion aspects of the research are summarized quantitatively. Alternative routes for conversion of sugar crops to fuels and chemicals are presented. (ERA citation 03:006207)

BNL-20313 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Preliminary Concept Analysis of a Low Cost Non-Metallic Flat Plate Solar Energy Collector.
J. G. Cottingham. 21 Jul 75, 15p

Keywords: Flat plate collectors, Cost, *Building materials, *Solar collectors, Thermal conductivity, Fabrication.

The concept of using non-metallic materials such as masonry, porcelain, or concrete as the thermal conducting media in the manufacture of flat plate solar energy collectors is examined and found functionally acceptable. The potential for large reduction in the cost of this component is illustrated.

BNL-20510 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Energy Institute for Developing Countries: A Working Paper.
P. F. Palmedo, and R. Nathans. May 74, 12p

Keywords: Developing countries, *Energy source development, Planning, Energy policy, Charges, Distribution, Economic development, Energy supplies, Forecasting, Production, Simulation.

The volatility of energy prices, as well as the precariousness of international energy supply, is forcing many developing countries to consider new ways to satisfy their energy needs over the next several decades. As a result it is likely that major changes in energy production - distribution systems will occur in large numbers of these countries. A necessary component of the important decisions these countries must make, e.g., with respect to changes in plans for their economic development or the introduction of new technologies, is the need to assess the alternatives and plan for their country's current and future energy needs. This working paper discusses the establishment of an Energy Institute for Developing Countries, whose major function would be to assist and work with interested countries in the performance of energy planning and assessment analyses. Other areas to be covered by the Institute include. (1) preparation of methodologies for evaluation and assessment of new technologies for individual countries; (2) generation of data bases of technical coefficients; (3) provision of user manuals, training of technical personnel and extensive consultations with appropriate government officials in developing countries; and (4) support to agencies and organizations in the U.S. concerned with energy problems in developing countries. The paper discusses the need for and characteristics of a comprehensive energy planning and assessment framework, and a scheme for micro and macro assessments of alternative energy technologies. It also lists a series of specific mechanisms for developing appropriate models and data bases, and transferring the results to interested developing countries.

BNL-21491 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Single Technology Pitfall
J. G. Cottingham. 1976, 9p Rept no. CONF-760657-1
Contract E(30-1)-16
New England solar energy conference, Amherst, Massachusetts, United States of America (USA), 24 Jun 1976.

Keywords: *Solar energy, Tower focus collectors, Cost, Economic development, *Solar collectors.

As a first step toward cost reduction six principles are suggested to enhance the solar energy cost picture: use solar energy as a supplement; find a year round application for your collector system; reduce the material content per unit area of collector; generate higher temperatures - make better use of second law of thermodynamics; develop commercial size air conditioning units first for economy; and adapt solar energy to current energy handling technology. The "baby power tower" collector at Brookhaven is sketched and used to illustrate these principles. (ERA citation 02:033915)

BNL-22311 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Role of Renewable Energy Technologies in Developing Countries
P. F. Palmedo. 10 Jan 77, 11p
Contract EY-76-C-02-0016

Keywords: Developing countries, *Energy source development, Technology utilization, Efficiency, Energy consumption, Energy sources, Financing, Global aspects, Planning, Recommendations, Research programs.

Some of the implications of the choice between renewable, decentralized technologies and nonrenewable, centralized technologies as applied to developing countries are presented. The focus on developing countries does not imply that the choice is not a pertinent one for developed countries, but only that it is a particularly pressing one for the lesser-developed countries. In order to clarify the significance of the distinction between renewable and depletable resources, two qualifications are made. The resource and its feasible system to use that resource is of primary interest. Sunlight is free but the devices to use that resource may require a rare metal, which then makes the use of solar energy not renewable. The second qualification is that some resources that are finite such as deuterium as used in fusion reactors have such large abundance that they can be considered renewable. Some specific steps that can be taken to give renewable energy resources an opportunity to compete on a more equal footing with conventional fossil and nuclear technologies in the LDCs are: stimulate and support energy planning in developing countries; include appropriate technology in developed country R and D programs; and develop and demonstrate technologies in the LDCs. These activities would represent no financial burden to the developed world. A realistic appraisal of potential renewable resources to meet the future enegy needs of developing countries is important. (ERA citation 02:039519)

BNL-23340 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook
Energy Planning and Management in Developing Countries: Thoughts Concerning a Conceptual Framework
R. Nathans, and P. F. Palmedo. 11 Oct 77, 39
Contract EY-76-C-02-0016

Keywords: Developing countries, *Energy management, Energy models, Data acquisition, Government policies, International cooperation, Planning, Social impact, Sociology, Urban areas.

The unique characteristics of the energy situation in developing countries imposes a unique set of requirements on analytical techniques used for energy planning. The urgency of the situation requires the rapid development and use of simplified models which make maximum use of available data but which can reflect the international energy context. Those techniques must also be able to deal with central energy/development issues such as energy equity or the energy impli-

cation of social equity policies, centralized vs. decentralized development, and urbanization. (ERA citation 03:024139)

BNL-24325 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Overview on Absorption Cooling Technology in Solar Applications
P. C. Auh. 1978, 6p Rept no. CONF-780249-2
Contract EY-76-C-02-0016
Workshop on the use of solar energy for the cooling of buildings, San Francisco, CA, USA, 15 Feb 1978.

Keywords: Absorption refrigeration cycle, Heat pumps, Solar air conditioning, Solar-assisted heat pumps, Performance, Reviews, *Solar cooling systems.

The following topics are reviewed briefly: chiller performance, commercial availability, system performance, internal energy storage, water-cooling limitation, COP limitation, absorption heat pump, and DOE activities. (ERA citation 03:052269)

BNL-25523 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Systems Approach to Energy Planning
P. F. Palmedo, and R. Nathans. 18 Nov 78, 21p
Rept no. CONF-781226-1
Contract EY-76-C-02-0016
Caribbean consultation on energy and Agriculture, Santo Domingo, Dominican Republic, 1 Dec 1978.

Keywords: Developing countries, *Energy source development, Energy supplies, Energy analysis, Planning, Regional analysis, Renewable energy sources, Systems analysis.

Many developing countries are embarking on a petroleum-intensive path of development just at a time in history when petroleum is about to become scarce and expensive. At the same time the use of traditional forms of energy--wood, crop residues, and animal waste--is meeting with a variety of problems. Long-range integrative national energy planning has become urgent. That planning should consider a wide range of geographical scales, from the household and village to the world scene. It should extend at least 25 years into the future. An overall framework for analysis is presented based on a normative, scenario approach. (ERA citation 04:033654)

BNL-25537 PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Application of Resource Allocation Models to the Problems of Regional Energy Policy in Large Developing Coutries
P. M. Meier, and V. Mubayi. 4 Jan 79, 35p Rept no. CONF-790134-1
Contract EY-76-C-02-0016
International seminar on energy, Hyderabad, India, 4 Jan 1979.

Keywords: Developing countries, Energy facilities, *Energy source development, Site selection, Allocations, Competition, Electric utilities, Energy models, Geography, India, Planning, Regional analysis, Resources, Simulation, State government.

The interregional allocation of, and competition for, natural resources for energy development is assuming increasing importance in many large developing countries, particularly in countries such as India that are in the more advanced stages of industrialization, and where state governments and regional agencies have significant planning powers. This paper explores the applicability of optimal resource allocation models designed primarily for already-developed economies, such as that of the U.S., Canada, and Western Europe, to the emerging problems of such developing countries. In particular, the potential application of electric-utility-siting models is discussed in the context of electric grid expansion in the State of Andhra Pradesh in Southern India. Specific topics addressed include the degree to which models can be effectively used in the rather different conditions and priorities of industrializing countries; the requirements for basic-model reformulations to account for unique factors of geography (climate, hyydrology, the extant conditions of the infrastructure within which any development must occur); and the ability to include and quantify environmental impacts of energy doveelopment as well as policy considerations relevant in the context of developing countries. The paper identifies desirable research directions, indicates data needs, and assesses those aspects of subnational energy-planning problems that should receive better emphasis in national and international energy-plannng efforts. (ERA citation 04:033733)

BNL-50633 PC A07/MF A01
Brookhaven National Lab., Upton, NY.
Planner's Energy Workbook: A Manual for Exploring Relationships Between Land Use and Energy Utilization
T. O. Carroll, R. Nathans, P. F. Palmedo, and R. Stern. Jun 77, 129
Contract EY-76-C-02-0016

Keywords: Energy analysis conservation, Energy supplies, *Land use, Rural areas, Urban areas, Communities, Charges, Correlations, Demand factors, Energy consumption, Energy policy, Government policies, Manuals, Planning, Regional analysis, Social impact, *Regional planning, *Energy management.

It has been clear that the magnitude and character of a region's energy requirements are intimately related to the spatial configuration and mix of land use activities. To the degree to which they can shape the future configurations of residential, commercial, industrial, and transportation activities, local governments and their planners must give serious consideration to the energy implications of those configurations in the light of future social goals and requirements. This Planner's Energy Workbook describes a set of procedures that can be used to carry out community and regional energy analyses. The choice of land use activity parameters and their relation to energy use characteristics are associated with the normal planning concepts of land use density, type of residential development, commercial floorspace, industrial sales and employment, and shopping and work trip lengths. At the same time these energy related intensity coefficients are expressed in a form that permits the analysis of short-term conservation strategies such as the retrofit of insulation and the introduction of new technologies such as solar energy. An integrating framework is provided to construct total community or area energy consumption profiles and future needs; to examine compatibility between area requirements and the energy supply-distribution system serving the area; and to evaluate the implications for energy use of the physical configuration of urban, suburban and rural areas. Two cases illustrate the application of this Workbook. The Long Island area is representative of major suburban regions throughout the U.S. which have undergone major growth and development. A community redevelopment design in Tuscon, Arizona is typical of rapid and major land use development within the environs of an existing city. (ERA citation 03:010551)

BNL-50836 PC A05/MF A01
Brookhaven National Lab., Upton, NY.
Less Developed Countries Energy System Network Simulator, LDC-ESNS: a Brief Description
A. Reisman, and R. Malone. Apr 78, 80p
Contract EY-76-C-02-0016

Keywords: Developing countries, Energy demand, Energy models, Energy supplies, By-products, Capital, Conversion, Design, Economic development, Energy, Environmental impacts, Flowsheets, Forecasting, Imports, Refining, Systems analysis, Transport, *Energy management.

Prepared for the Brookhaven National Laboratory Developing Countries Energy Program, this report describes the Less Developed Countries Energy System Network Simulator (LDC-ESNS), a tool which provides a quantitative representation of the energy system of an LDC. The network structure of the energy supply and demand system, the model inputs and outputs, and the possible uses of the model for analysis are described. (ERA citation 03:055216)

BNL-50890 PC A08/MF A01
National Center for Analysis of Energy Systems, Upton, NY.
Programmatic Areas for U.S. Assistance for Energy in the Developing Countries
P. F. Palmedo, R. Nathans, E. Beardsworth, and G. Tschannerl. Dec 78, 118p
Contract EY-78-C-02-0016

Keywords: Developing countries, Federal assistance programs, Economic development, Education, Energy sources, Financing, Renewable energy sources, Sociology, Technology transfer, USA, *Energy source development.

A previous report entitled Energy Needs, Uses and Resources in Developing Countries presented an analysis of the energy problems facing the developing countries and the types of solutions that are available to them. In this report a wide variety of U.S. assistance programs which can facilitate those solutions is identified. The report identifies 28 programmatic areas for assistance activities. In each area specific projects are indicated as examples and the general level of required funding is estimated. Twenty-two programmatic areas cover the development of conventional and renewable energy resources and technologies; six with assessment and planning, energy institutions, and training and education. Two hypothetical overall assistance programs are described with possible project distributions encompassing some twenty countries. A broadly based U.S. energy assistance program which draws upon the highest quality of U.S. technical capabilities can make a significant contribution to the future economic and sociologic well-being of the developing countries of the world. (ERA citation 04:043176)

BNL-50988 PC A05/MF A01
Brookhaven National Lab., Upton, NY.
Directory of Energy--Related Educational Programs
N. S. Wake. Dec 78, 79p
Contract EY-76-C-02-0016

Keywords: Education, *Energy, Biomass, Curriculum guides, Developing countries, Educational tools, Energy management, Energy sources, Engineering, Environmental engineering, Geology, Inventories, Nuclear engineering, Solar energy, USA, Wind power.

This report presents an inventory of energy-related training programs being offered within United States Educational Institutions that might meet the training needs of less developed countries Training programs in the energy area include the areas of energy resources, energy planning and analysis, the development and utilization of different energy technologies including renewable sources, and engineering. (ERA citation 04:046918)

BNL-51194 PC A05/MF A01
Brookhaven National Lab., Upton, NY.
Development of a Glass Polymer Composite Sewer Pipe from Waste Glass. Final Report
R. Rayfiel, and L. E. Kukacka. Feb 80, 76p
Contract AC02-76CH00016

Keywords: *Asbestos, *Cement, *Clays, Composite materials, *Glass, Reinforced concrete, *Pipes(Tubes), *Waste recycling, Comparative evaluations, Cost, Fabrication, Mechanical properties, Pipelines, Recycling, Sewage, Wastes.

A range of polymer-aggregate composites for applications in industry which appear to be economically attractive and contribute to energy conservation were developed at BNL. Waste glass is the aggregate in one such material, which is called glass-polymer-composite (GPC). This report assays the economics and durability of GPC in piping for storm drains and sewers. The properties of the pipe are compared statistically with the requirements of industrial specifications. These establish the raw materials requirements. The capital and operating costs for producing pipe are then estimated. Using published sales values for competing materials, the return on investment is calculated for two cases. The ultimate energy requirement of the raw materials in GPC is compared with the corresponding requirement for vitrified clay pipe. The strengths of GPC, reinforced concrete, vitrified clay and asbestos cement pipe are compared after extended exposure to various media. The status of process and product development is reviewed and recommendations are made for future work. (ERA citation 05:033908)

COM-71-00049/1 PC A11/MF A01
Bureau of Commercial Fisheries, Ann Arbor, Mich.
A Program of Research for the Catfish Farming Industry.
Sep 70, 233p* EDACOMM-70-015

Keywords: Fisheries, Economic development, Catfishes, Aquaculture, Surveys, Methodology, Feeding

stuffs, Harvesting, Processing, Marketing, Food services, Ponds, Lakes, Equipment, Statistical data, Profits, *Fishes, Fish farms.

The study reports on the history and current state of the industry, improvement of harvesting methods and equipment, and present and future markets including pay-lakes and restaurants. Research results are reported as regards catfish processing and feedstuffs and diets for catfish. (EDA ABSTRACT)

COM-71-00111/9 PC A20/MF A01
Checchi and Co., Washington, DC.
The Role of Cooperatives in the Production and Marketing of Fruits and Vegetables in Puerto Rico.
Final rept.
Aug 70, 474p EDA-70-020
Grant EDA-02-6-09134

Keywords: *Marketing, Cooperation, Farm processing, Economic development, *Puerto Rico, Agricultural products, *Fruits, *Vegetables, Financial management, Management engineering, Local government, Policies, Market research, Economic factors, Technical assistance projects, *Agricultural cooperatives, Cooperatives, Cooperative production and marketing systems.

The report concludes that a new fruit and vegetable growing and marketing cooperative should be established as the basic element in an approach to self-sufficiency in fruit and vegetable production for Puerto Rico. The study says adequate financing and management and enthusiastic support from the Commonwealth government can produce an agricultural cooperative that will contribute significantly to community economy. Types of produce have been examined in terms of production and marketing. Organization of cooperatives is also discussed. (EDA abstract)

COM-71-00716/5 PC A17/MF A01
Black and Veatch, Kansas City, MO.
Preliminary Study of the Development of Water Resources of the Humacao Sub-Region Puerto Rico
May 71, 388p EDA-71-060
Prepared in cooperation with Domenech (R. A.) and Associates, Hato Rey, Puerto Rico.

Keywords: *Water supply, Surveys, Economic development, *Puerto Rico, *Water resources, Requirements, Recommendations, Surface water runoff, Groundwater, Demography, Econometrics, Water storage, Classifications, Soil erosion, Waste water, Flood control, Government policies, Humacao(Puerto Rico).

The report appraises present and future water needs and analyzes potential yield from sources of water supply. Surface water and ground water control problems are identified. Alternative recommendations are made on how to provide water for the area's change over from an agricultural to an industrial economy. These include use of ground water as an economical water source and surface water through reservoirs, wastewater reclamation, and long distance imports. Sea water as a source is reported as uneconomical. Other recommendations: floodways and levees rather than storage reservoirs for flood control. Wastewater disposal in the ocean with disposal in streams to be phased out. Data to be coordinated for guidance in design of water development projects, and strict regulation to be provided to avoid waste resulting from increasing competition for water supplies. Detailed maps and figures are included.

COM-71-01017/7 PC A05 MF A01
National Marine Fisheries Service, Gloucester, Mass. Fishery Products Technology Lab.
A Study to Develop New Products from Whiting or Other Underutilized Species
Feasibility study Nov 68-Oct 70
M. L. Anderson, and J. M. Mendelsohn. Aug 71, 79p EDA-71-090

Keywords: *Fishes, *Food processing, Economic development, Abundance, Unemployment, Freeze drying, Market research, Cost estimates, Feasibility, Whiting, Salt curing, Fishcakes.

The study describes development of a rapid salt-curing process for whiting and similar species that are underutilized when they are most seasonally abundant. The process requires fish fillets to be ground in saturated brine with salt added to keep the brine saturated during salting. It can be completed in less than a day. Reports indicate the product is a good ingredient for fishcakes and can be used to make convenience-type heat-and-serve foods. Limited marketing studies indicate good commercial potential for these products when a meat-bone separator is further developed. The report says whiting and related products must be produced on a semi-commercial scale before costs can be assessed, but that estimates indicate they can be competitive wth other products now on the market. (Author)

COM-71-50584/6 PC A02/MF A01
Rhode Island Univ., Kingston, International Center for Marine Resource Development.
The Potential for Fishery Development in the Caribbean and Adjacent Seas
Clarence P. Idyll. 1971, 17p Marine Bull-1, NOAA-71102004
Presented at Rhode Island Univ. on Mar 16, 1971, at a seminar on issues of International Economic Development.

Keywords: *Fisheries, Economic development, Caribbean Sea, Developing countries, Food supply, Economic factors, Fishing, Seafood, Financing, Marketing, Manpower, Government policies.

The Caribbean Region is examined for its potential to produce greater supplies of food from the sea. The Caribbean people are relatively large consumers of fish and spend an important part of their scare foreign exchange to buy fish from other nations. In considering the potential of fish and seafood from these enormous water areas it would appear that importing large supplies of seafood would be unnecessary. Factors to consider in fishery development in this area include the political, social and economic aspects, since these determine whether whatever fish is available can be transported, marketed and purchased by the people of this area. (Author)

COM-72-10048/0 PC A02/MF A01
Kansas Agricultural Experiment Station, Manhattan.
Producing Channel Catfish
Otto W. Tiemeier, and Charles W. Deyoe. May 67, 24p Bull-508, NOAA-72011312
Grant NMFS-4-1-R
Also pub. as Kansas State Univ., Manhattan. Dept. of Zoology Contrib-396 and Dept. of Grain Science and Industry Contrib-593.

Keywords: Aquaculture, Catfishes, *Ponds, Animal nutrition, Feeding stuffs, Animal diseases, Reproduction(Animal), Soils, Fertilizing, *Fishes.

Information on the production of channel catfish in ponds includes pond characteristics, dissolved oxygen, stocking, feeding, and suggested treatments for fish diseases. (Author)

COM-72-10054/8 PC A03/MF A01
Colorado Cooperative Fishery Univ, Fort Collins.
Pond Culture of Bait Fishes
Stephen A. Flickinger. 1 Apr 71, 43p NOAA-72011322
Grant NMFS-6-2-D
Also pub. as Colorado Univ., Fort Collins. Cooperative Extension Service Bull-478A.

Keywords: Aquaculture, Minnows, Economic surveys, Marketing, *Ponds, Construction, Fresh water biology, Fishing, Feeding(Supplying), Diseases, Reproduction(Biology), Parasites, *Fishes, Bait fishes, Pond culture.

Major considerations in the culture of the golden shiner and fathead minnow as bait fish are presented. Emphasis is upon economic considerations, pond construction, propagation techniques, feeding and harvesting. (Author)

COM-72-10055/5 PC A02/MF A01
State Coll. of Arkansas, Conway.
Culturing Trout in Cages
Completion rept. 2 Nov 70-30 Jun 71
Richard A. Collins. Sep 71, 14p NOAA-72011321
Grant NMFS-2-133-R
Prepared in cooperation with Arkansas Game and Fish Commission, Little Rock, Ark.

Keywords: Aquaculture, Trout, Freshwater fishes, Diets, Growth curves, Water, Temperature, Fisheries, *Fishes, *Cage culture.

The major objectives of the study were to determine the feasibility of culturing rainbow trout in cages from fingerlings to edible size during the cooler months of the year in warmwater lakes, the proper stocking density in the cages, and the economic feasibility of culturing trout in cages. (Author)

COM-72-10056/3 PC A02/MF A01
State Coll. of Arkansas, Conway.
Development of the Cage Culture Method of Fish Production for Commercial Use in Large Reservoir Lakes
Completion rept. 1 Mar 70-28 Feb 71
Richard A. Collins. Aug 71, 14p NOAA-72011320
Grant NMFS-4-67-D
Prepared in cooperation with Arkansas Game and Fish Commission, Little Rock, Ark.

Keywords: *Aquaculture, Catfishes, Freshwater fishes, Growth curves, Diets, Reservoirs, *Fisheries, Fish cages, Cage culture.

Four different cage designs ranging in volume from three to 12 cubic yards were each stocked with 300 fingerling catfish per cubic yard to determine the effects of the different cage sizes on growth and conversion of the fish. Fingerlings were graded to a uniform size before being stocked in an attempt to eliminate the differential growth. Results indicate that in large reservoir lakes the cage size can be unlimited in surface area and as deep as the water containing adequate dissolved oxygen. The depth of the cages had no important bearing on the growth rate and in the cages with the greater surface area the catfish grew more rapidly and converted food better. It was concluded that differential growth of catfish in cages is a result of initial variance of the fingerling fish and not to hierarchy. Large numbers of wild fish around the cages caused problems of loss of food and possibly introduction of diseases. The wild fish can, however, be effectively trapped in the area of the cages. The economic evaluation indicates the following situations: a small scale operation incorporated into an existing business such as a marina and a very large scale operation (200,000 or more fish). (Author)

COM-72-10588/5 PC A06/MF A01
Bureau of Sport Fisheries and Wildlife, Stuttgart, Ark. Warmwater Fish Cultural Labs.
Factors Affecting the Growth and Production of Channel Catfish in Raceways
Jun 72, 108p EDA-72-036

Keywords: *Fishes, Aquaculture, Economic development, Nutrition, Growth, Waste treatment, Organic wastes, Catfish, Ictalurus catus.

The study shows that fish can be reared successfully in tanks, but that production costs under the present system would eliminate all profit. Data are presented to indicate that further studies would be useful. It is stated that recycling of effluent waters can reduce levels of metabolic wastes sufficiently to support fish growth. The report includes evaluations of filters and of an oxidation pool to remove wastes, stocking density and diet studies, and reports on examinations of plasma proteins, tissue composition, and the liver of channel catfish.

COM-72-11160/2 PC A05/MF A01
Georgia Game and Fish Commission, Atlanta.
A Study of the Nutritional, Physiological and Economical Requirements for the Production of Channel Catfish in an Intensive Running Water Culture
Completion rept. 1 Apr 69-31 Apr 72
James W. Andrews. 20 Jun 72, 82p NOAA-72091969
Grant NMFS-2-84-R

Keywords: Catfishes, Aquaculture, Animal nutrition, Feeding stuffs, Growth, Metabolism, Amino acids, Calcium, Phosphorus, Temperature, Dissolved oxygen, Photoperiodicity, *Fishes, Ictalurus punctatus.

Fourteen studies were conducted on the nutritional and physiological requirements for the high density culture of channel catfish. Results from the initial experiments on stocking rate-water exchange require-

ments indicated that the possibility of commercial culture of catfish at high densities (up to 8 pounds per cu. ft. of water) in tanks or raceways has great potential. Additional environment requirement studies were conducted on the effects of temperature, photoperiod, dissolved oxygen levels and frequency of feeding on growth, food conversion and body composition. (Author)

COM-72-11408-18 PC A08/MF A01
Foods Multinational, Inc., Groton, Mass.
The Design of an Aquaculture Enterprise
Harold H. Webber. Nov 71, 10p NOAA-72092501-18
Included in Gulf and Caribbean Fisheries Inst. Annual Session (24th), Miami, Fla., Nov 71. Proceedings May 72, p117-125, COM-72-11408.

Keywords: *Aquaculture, Economic analysis, Fishes, *Fisheries, Management methods.

Existing methods of growing fish in high density cultures are described, and a check list of site selection criteria is given. (Author)

COM-72-11539/7 PC A04/MF A01
Gibbs and Hill, Inc., New York.
Feasibility Study of Waste Water Recovery in Shrimp Processing Plants
Nov 72, 63p EDA-72-058

Keywords: Shrimps, Food processing, Waste water, Recovery, Economic development, Employment, Regional planning, Feasibility, Water reclamation, Massachusetts, Fishing, Food industry, Cost analysis, *Fishes, *Waste Water reuse, Gloucester(Massachusetts).

The shrimp industry is capable of revitalizing the economy in Gloucester, Massachusetts, where fishing and fish processing employment has been waning. The study examines the need to provide waste water recovery facilities and peeling machinery modifications, so that the shrimp industry can develop new processing plants at Gloucester. Cost and technical processing data is included in the study, together with a schematic diagram indicating suggested facilities and modifications. (Author)

COM-73-10152/9 PC A04/MF A01
Massachusetts Inst. of Tech., Cambridge. Sea Grant Project Office.
A Preliminary Feasibility Study of Irish Moss Harvesting Systems
James M. Patell. 30 Jun 72, 74p MITSG-72-14, NOAA-72121102
Contract NOAA-2-35150
Sponsored in part by Henry L. and Grace Doherty Charitable Foundation, Inc., Darien, Conn.

Keywords: Aquatic plants, Harvesting, Algae, Rhodophyta, Evaluation, Feasibility, Machinery, Massachusetts, New Hampshire, Economic development, Maine, Coasts, *Aquatic plant control, Sea Grant program, Chondrus crispus, Gigartina stellata.

The feasibility of developing mechanized harvesting systems is discussed. Biological, economic, environmental, and legal constraints on the system design are delineated. The operation of two systems which have been constructed and tested is described. It is concluded that while the technology to construct the system exists, such a system would be economically unfeasible due to the low unit price of harvested Irish Moss. An improved manual harvester is also described. (Author)

COM-73-10275/8 PC A02/MF A01
Rhode Island Univ., Kingston. Marine Advisory Service.
Fisheries Cooperatives: Their Formation and Operation
James J. Napoli. Oct 72, 21p Marine M-30, NOAA-73012403

Keywords: Fisheries, Production, Marketing, Cooperation, Organizations, Law(Jurisprudence), Harvesting, Credit, Management, Banking business, *Fishery cooperatives, Cooperatives.

The organization, development, function, and problems of producer cooperatives for fishermen are discussed. An appendix covers the Farm Credit System: its organization, authority, and eligibility requirements to borrow. (Author)

COM-73-10333/5 PC A03/MF A01
California State Univ., Humboldt, Arcata. Marine Advisory Extension Service.
A Pilot Fish-Pond System for Utilization of Sewage Effluents, Humboldt Bay, Northern California
George Allen, Guy Conversano, and Bryan Colwell. Sep 72, 31p CSUH-SG-3, NOAA-73020201
Errata sheet inserted.

Keywords: *Aquaculture, *Sewage disposal, Lagoons(Ponds), Utilization, Cost estimates, Site surveys, Construction costs, Construction materials, Aeration ponds, Arcata(California).

The paper documents all out-of-pockot and other real costs in the construction of a pilot fish pond system for the utilization of sewage effluents, Humboldt Bay, Northern California. Discussions deal with the engineering and construction problems encountered. A description of the project site and reasons for site selection are explained.

COM-73-10343/4 PC A03/MF A01
Lake States Forestry Cooperative, Inc., Duluth, Minn.
Forestry Cooperative Demonstration Program
Interim rept. Feb 70-Nov 72.
Mar 73, 47p EDA-73-020

Keywords: Economic development, *Forestry, Great Lakes Region, Management planning, Land use, Marketing, Rural areas, Forest land, Employment, Organizations, Technical assistance, Cooperatives.

The report describes a forestry cooperative demonstration project funded by EDA and the Upper Great Lakes Regional Commission to evaluate potential for forestry cooperatives in the Great Lake States. A 6-months feasibility study shows need for an organization to work with private woodland owners on management practices. Also described is a business development program, which assisted existing businesses, helped create new business, and provided management and marketing assistance. The potential for a statewide landowners' association is explored. A section of the report is devoted to implications for rural development activities, with emphasis on cooperativos. (Author)

COM-73-10355/8 PC A02/MF A01
Utah State Board for Vocational Education, Salt Lake City.
Piute Vocational Education Project--Piute County School District
Final rept.
Oct 72, 20p FCRC-TA-411-112-035

Keywords: *Education, Farms, *Vocational guidance, New Mexico, Economic development, Projects, Specialized training, Community development, Surveys, Livestock, Water supply, Dairies, Poultry, Swine, Land development, Mining, Piute County(New Mexico), Tourism.

A report is made on planning and implementation of farm program curricula and demonstration projects.

COM-73-10527/2 PC A03/MF A01
New Mexico Univ., Albuquerque. Center of Environmental Research and Development.
A Study of the Feasibility of Mechanized Adobe Production
Aug 70, 49p FCRC-TA-301-500-013

Keywords: *Bricks, Mass production, Houses, Brick construction, Brick structures, Structural clay products, Brick industry, Materials handling, Production methods, Feasibility, Cost analysis, Building codes, *Adobe, Adobe construction.

The general purpose of this study is to determine the economic feasibility of the Centro de Adobes concept, considered an Economic Opportunity Development for the poor. The project designers see the creation of from 15 to 30 new jobs per manufacturing center. It is also necessary to predict the subsidary job creation as well as to estimate what this may mean in terms of dollar turnover in the total economy of a typical village (and in general terms, of the state). (Author)

COM-73-10771/6 PC A05/MF A01
Miami Univ., Fla. Sea Grant Institutional Program.
The Commercial Feasibility of Rearing Pompano, 'Trachinotus carolinus' (Linnaeus), in Cages
Theodore Isaac Jogues Smith. Jan 73, 80p Sea Grant Technical Bull-26, NOAA-73050817
Contract NOAA-2-35147

Keywords: *Fishes, Aquaculture, Growth, Mortality, Diseases, Economics, Florida, *Cage culture, Sea Grant program, Trachinotus carolinus.

The University of Miami has been actively involved in developing pompano farming as a viable industry, both through its research programs and its consultations with companies involved with pompano-rearing. Objectives of this project were to assess the suitability of cages for raising pompano and to measure growth and mortality at stocking densities that would be likely in a commercial operation. This paper presents the results of the above investigation and, on the basis of data collected and observations made, discusses the problems and future of pompano farming as a potential industry.

COM-73-10790/6 PC A02/MF A01
Oregon State Univ., Corvallis. Sea Grant Marine Advisory Program.
Organizing and Operating a Fishery Cooperative. Part One
Frederick J. Smith. 1973, 5p OSU-SG-19, NOAA-73050201
See also Part 2, COM-73-10791.

Keywords: Fisheries, Management, Organizing, Industries, Law(Jurisprudence), Operations, Sea Grant program, *Fishery cooperatives.

The publication provides information about cooperative organization, management, and legal instruments used in organizing and operating a cooperative. It is available in two parts. This portion, part one, provides an overview of cooperative organization and operation. Part two provides greater detail about the legal instruments and requirements of a fishery cooperative.

COM-73-10791/4 PC E01/MF A01
Oregon State Univ., Corvallis. Sea Grant Marine Advisory Program.
Organizing and Operating a Fishery Cooperative. Part II
Frederick J. Smith. 1973, 45 OSU-SG-19a, NOAA-73050202
See also Part 1, COM-73-10790.

Keywords: Fisheries, Organizations, Law(Jurisprudence), Management, Industries, Marketing, Regulations, *Fishery cooperatives, Sea Grant program.

The publication provides information about cooperative organization, management, and legal instruments used in organizing and operating a cooperative. It is available in two parts. The first part provides an overview of cooperative organization and operation. This portion, part two, provides greater detail about the legal instruments and requirements of a fishery cooperative.

COM-73-10795/5 PC A05/MF A01
Puerto Rico Dept. of Agriculture, Mayaguez. Lab. of Commercial Fisheries.
A Study of the Feasibility of Establishing a Distant-Water Fishing Industry in Puerto Rico
Feasibility study.
May 73, 79p EDA-73-032
Contract C-0-35464

Keywords: *Fisheries, Feasibility, Economic development, *Puerto Rico, Aquaculture, Employment, Unemployment, Financing, Bibliographies, Regional planning, Technical assistance.

The report reviews possibilities for a distant-water fishing industry in Puerto Rico and concludes that fishing, processing, and shore support can all be developed for profit but not without risk. It is suggested that a Puerto Rican fleet could harvest a substantial amount of fish in the Caribbean and the tropical Atlantic. Alternatives of how best to do this are presented. The report also reviews potential for developing Puerto

Rican-based processing facilities and shore support services. A bibliography is appended.

COM-73-10810/2 PC A02/MF A01
Illinois State Natural History Survey, Urbana. Aquatic Biology Section.
Combined Culture of Channel Catfish and Golden Shiners in Wading Pools
D. Homer Buck, Richard J. Baur, Charles F. III Tholts, and C. Russell Rose. Apr 72, 13p Biological Notes-79, NOAA-73050404
Grant NMFS-4-36-R

Keywords: *Fishes, *Aquaculture, Catfishes, Carp, Minnows, Shiners, Mixing, Growth, Ecology, Ictalurus punctatus, Notemigonus crysoleucas, Tilapia mossambica, Cyprinus carpio, Tilapia aurea, Animal behavior.

The study was undertaken to obtain information on the behavior, comparative efficiences, and degrees of compatibility of channel catfish and golden shiners when in different combinations and under different spatial limitations. It was found that growth increments of carp (Cyprinus carpio) and tilapia (Tilapia aurea) in mixed culture sometimes exceeded those exhibited by either in monoculture. The authors found that the channel catfish, golden shiner and tilapia (T. mossambica) were extremely compatible. When combined, each stimulated the other to a faster and stronger feeding response, which resulted in a more efficient conversion of food.

COM-74-10007/4 PC A03/MF A01
Miami Univ., Fla. Sea Grant Institutional Program.
Guide to the Lobsters and Lobster-Like Animals of Florida, the Gulf of Mexico and the Caribbean Region
Lee Opresko, Dennis Opresko, Ronald Thomas, Gilbert Voss, and Frederick M. Bayer. Aug 73, 49p Sea Grant Field Guide Ser-1, NOAA-73112311
Grant NOAA-043-158-27

Keywords: Lobsters, Shellfish, *Fisheries, Identifying, Manuals, Florida, Mexico Gulf, Caribbean Sea, Distribution(Property), Sea Grant program, NOAA.

The manual is intended to provide the non-specialist with the means of identifying in the field, both the shallow water and deep-water lobsters which either are already fished commercially or might be fished if sufficient stocks could be discovered through exploratory trawling. To accomplish this end, a key is given together with explanatory illustrations of the important features used for identification. Preference has been given to conspicuous external characters such as shape, coloring, and sculptural features. The known geographical distribution of the various species is included in the descriptions, along with known depth ranges. Insofar as known, growth rates, spawning times, temperature and bottom conditions, and other pertinent data are given.

COM-74-10173/4 PC A04/MF A01
Oregon State Univ., Corvallis.
Preparation of Fish Protein Hydrolysates
Completion rept. Jul 70-Jun 73
David L. Crawford. Jul 73, 55p NOAA-73122104
Grant NMFS-1-69-R

Keywords: *Fish protein concentrates, Digestion(Decomposition), Hydrolases, Fishes, Preparation, Hydrolysis, Food processing, Food storage, Solvent extraction. Hake, Merluccius productus.

An innovative procedure for developing and building a laboratory digestion unit capable of handling and producing approximately 10 liters of fish protein hydrolysate (FPH) is described. The unit consists of a pump, heat exchanger, and holding vat. Comminuted fish is pumped from the holding vat through the heat exchange system and recycled back into the holding vat until the comminuted fish reaches 140F. It is held at this temperature for one half hour at which point the comminuted fish, if capable of autolysis, will have shown a marked decrease in viscosity. The digestion process frees the fish bones from its fleshy matrix and may be easily separated at this point by sieving or centrifugation. The development of the laboratory digester provided a tool with which to determine the autolytic capabilities of other fish and fish scrap species. A detailed mineral analyses of bones prepared from seven species of autolyzed fish was conducted as well as preliminary examination on the general chemical and biological parameters of this autolyzed FPH.

COM-74-10364/9 PC A03/MF A01
Georgia Marine Science Center, Savannah.
A Manual of Flatfish Rearing
Technical rept.
David B. White, and Robert R. Stickney. Sep 73, 42p* TR-73-7, NOAA-74011408
Contract NOAA-1-36009

Keywords: Flatfishes, Aquaculture, Animal nutrition, Diets, Larvae, Animal diseases, Documentation, Manuals, *Fishes, Sea Grant program, Paralichthys, Paralichthys lethostigma, Ancylopsetta quadrocilata.

Basic culture techniques for rearing flatfishes are presented with consideration of supplies of eggs for culture, larval food and disease control, collection and care of postlarvae and juveniles, nutrition of postlarvae and juveniles, and environmental conditions for Paralichthys culture. Recommendation on site selection and construction of a physical plant are included. Three species of flatfish - Paralichthys dentatus, P. lethostigma, and Ancylopsetta quadrocellata are involved. This paper is intended as an introductory presentation to the layman who desires to work with one or more phases of the life cycle of the flatfish, and should serve as an introduction to the literature and culture techniques for interested scientists. Thirty-seven references are cited.

COM-74-10394/6 PC E02/MF A01
National Bureau of Standards, Washington, D.C. Office of Engineering and Information Processing Standards.
National Program of Metrology for Ecuador
Final rept.
Thomas M. Stabler. Apr 73, 33p Rept no. NBSIR-73-157

Keywords: *Metrology, *Ecuador, Project planning, Foreign aid, Developing countries, Standardization, Education, Units of measurement, Recommendations, Classifications.

At the request of the Ecuadorian Institute of Standardization (INEN) the U.S. AID made arrangements for a weights and measures advisor to assist in the development of a program for scientific and legal metrology, including the design of a metrology laboratory, inspection system, a training program, and other essential features. A four week survey by an NBS representative has resulted in recommendations for a metrology laboratory, physical standards, an Ecuadorian weights and measures law, regulations, and a control program.

COM-74-10540/8 PC E02/MF A01
Wisconsin Univ., Madison. Center of Applied Sociology.
Problems and Challenges Faced by Rural Communities with Industrial Development
John T. Scott, Jr, and Gene F. Summers. 1972, 25p EDA/OER-74-182
Grant EDA-OER-417-G-72-7
Prepared in cooperation with Illinois Univ., Urbana. Presented at North Central Regional Conference on Problems and Potentials of Rural Industrialization at Purdue, Univ., Lafayette, Ind., 11-13 Jul 72.

Keywords: Rural areas, Industrialization, Problem solving, Economic development, Community relations, Economic impact, Illinois, Manufacturing, Industrial plants, *Industrial development, Social effect, Labor force, Economic changes, Land use, Cost of living, *Socioeconomic status, Challenges.

The paper reviews a few typical problem areas which may arise in a rural community during and following industrialization. Data from a longitudinal (1966-1971) study of the construction of a large manufacturing facility in north central Illinois is used. Included in the discussion are such factors as the social and economic effects of the labor force employed by the industry, changes in the use of land and local facilities, and potential increases in the cost of living.

COM-74-10692/3 PC A11/MF A01
Texas A and M Univ., College Station. Dept. of Marine Resources Information.
Syllabus of Fish Health Management: I. Fish Culture Methods. II. Fish Disease Diagnosis
George W. Klontz. Dec 73, 235p* TAMU-SG-74-401, NOAA-74030411
Prepared in cooperation with Idaho Univ., Moscow.

Keywords: *Aquaculture, *Animal diseases, *Fishes, Bacteria, Viruses, Nutrition, Epidemiology, Parasitic diseases, Fungus diseases, Mycobacterium, Animal ecology, Diagnosis, Toxicity, Hematology, Sea Grant program, Neoplastic diseases, Idiopathic diseases.

The syllabus of fish health management consists of two sections. The first which deals with fish culture methods, gives information on: fish culture (husbandry) in the U.S.; types of fish husbandry; the basic constituents of a fish rearing facility; and fish nutrition. The second provides information on fish disease diagnosis. Subjects encompassed are: Principles of epidemiology of fish diseases; diagnostic methodology; and treatment and control of fish diseases. The types of diseases are bacterial, virus, mycotic, parasitic, environmental, nutritional, neoplastic, and idiopathic. The taxonomy of fish parasites is set forth in the report.

COM-74-10722/8 PC E09/MF A01
National Bureau of Standards, Washington, DC.
Research Study on the Socio-Economic Aspects of Low-Cost Housing in the Philippines
Final rept.
May 72, 250p Rept no. NBS-GCR-73-21
Prepared in Sycip, Goores, Velayo and Co., Manila, Philippines. Sponsored in part by Agency for International Development, Washington, D.C.

Keywords: Housing studies, *Philippines, Typhoons, Damage, Demographic surveys, Economic surveys, Low cost housing, Community facilities, Housing starts, Climate influence, Household composition, Construction practices, Building codes, Socioeconomic conditions, *Housing.

The report presents a survey of the historical occurrence of damages by typhoons, selected comparative indices for climate and housing construction, and an economic profile of the Philippines, as well as a regional demographic profile. A discussion is also presented on size and density of household dwelling units, trends in housing space expansion, community and municipal facilities; household income and household expenditures; financing sources for housing construction; availability and prices of construction materials and of labor; the capabilities of the housing industries; public reaction to new designs and materials; methods of housing construction; and building codes.

COM-74-10910/9 PC A02/MF A01
Tennessee Game and Fish Commission, Nashville.
Production of Channel Catfish in Cages
Completion rept. Mar 71-Feb 73
Harold Hurst. Sep 73, 20p NOAA-74022630
Grant NMFS-2-144-R

Keywords: Catfishes, Feeding habits, Aquaculture, Cost comparison, Feeding stuffs, Tennessee, *Fishes, *Cage culture.

During 1971 and 1972, channel catfish fingerlings were stocked in cages at Maples Creek Lake, a 90-acre public fishing lake located in Carroll County, TN, to study some techniques involved in the production of channel catfish in cages. The fish were fed from July 30, 1971 until May 29, 1972 at which time they were harvested. The maximum production achieved in any cage was 575 lb/cu M. There was no significant difference in net gain or feed conversion due to the different stocking rates, which indicated crowding was not a factor in any of the cages. An analysis of production data indicated there was no significant difference in net gain or feed conversion due to feeding method. (Modified author abstract)

COM-74-11005/7 PC A05/MF A01
Marine Technology Society, Washington, DC. Committee on Economic Potential of the Ocean.
Assessing Technology for Marine Resource Development. Proceedings of a Conference-Workshop Held by the Marine Technology Society at Arlington, Virginia on May 15-17, 1972
Milton G. Johnson. Mar 74, 97p* NOAA-74032701

Keywords: *Marine engineering, Ocean environments, Meetings, Forecasting, Economic development, Oceanography, Investments, Government policies, Management planning, Technology assessment.

Contents:
Technology assessment:
Its purpose, method, and scope;
The past, present and future of technology assessment;
Technology forecasting:
How good it is;
Technology assessment of marine resources development;
Assessment of technologies for the protection and enhancement of the marine environment;
Requirements of the Congress for Technology Assessment;
Planning a balanced university program of oceanographic education and research;
Criteria for corporate investment in ocean research and development;
Our changing ocean priorities;
The role of Congress in marine research and resource development;
The role of the Office of Science and Technology;
Oceanography - a budgetary controllable whose time may not come;
Technology:
Reassessment and reassurance.

COM-74-11722/7 PC A08/MF A01
National Bureau of Standards, Washington, D.C. Inst. for Computer Sciences and Technology.
Guidelines for the Use of Computer Technology in the Developing Countries
Interim rept
Ralph A. Simmons. Dec 73, 171p* Rept no. NBSIR-73-423

Keywords: *Computers, Developing countries, Computer programming, Data processing, Education, Foreign aid, Nigeria, Ethiopia, Uganda, Turkey, Brazil, Colombia, Korea, Taiwan, Thailand.

The objective of this report is to contribute to more effective use of computer technology by the developing countries. An intensive survey of computer use and development in nine selected countries and an analysis of other supporting data have resulted in the formulation of specific conclusions. Recommendations for guidance of responsible officials in the developing countries and in the Agency for International Development have been developed in response to the conclusions and are presented in summary form. Later sections of the report include the facts and discussions in support of the conclusions, with emphasis on the responsibilities of the national governments, the problems of education and training, present computer applications, and the role of ADP standards. The results of the individual country surveys are included in the appendix. The report is a part of joint efforts on the part of the Department of Commerce and the Agency for International Development to bring U.S. high technology more effectively to bear on the problems of economic and social development in the less-developed countries of the world.

COM-74-11781/3 PC A02
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.
A Fisherman's Co-operative: Open System Theory Applied
Carl Gersuny, and John J. Poggie, Jr. 1974, 11p
Marine Reprint-25, NOAA-74102402
Grant NOAA-04-3-158-3
Pub. in Marit. Stud. Mgmt., v1 p215-222 1974.

Keywords: Fish marketing, Commercial fishing, Cooperative enterprises, Prices, Costs, Fishing equipment, New England, *Fishery cooperatives, Reprints, Sea Grant program.

There are about eighty co-operative associations in the commercial fisheries of the United States. Of these, the Point Judith Fishermen's Co-operative Association is one of the most successful. Fishermen are motivated to band together in such organizations by the payment of low prices by fish dealers, by high individual costs in getting fish to the market, by the inordinate expense of money and time in obtaining equipment on a retail, individual basis, and by an unsatisfactory supply of producer services beneficial to fishing. As a case study to illustrate and analyse the functioning of co-operative within the framework of Thompson'S open system theory the Point Judith Fishermen's Co-operative Association is described.

COM-74-50182/6 MF A01
National Bureau of Standards, Washington, DC.
Some References on Metric Information with Charts on All You Need to Know About Metric; Metric Conversion Fractors
Special pub.
W. Small. Dec 73, 13p Rept no. NBS-SP-389
Paper copy available from GPO as C13.10:389.

Keywords: *Metric system, Conversion, Tables(Data).

As metric use increases in this country, interest in metric information is also increasing. This booklet was developed to provide a listing of sources for pertinent metric information. Included is a list of publications produced by the National Bureau of Standards and available from the Superintendent of Documents. Also included is a list assembled by the National Council of Teachers of Mathematics of organizations that market metric materials for educators, and a list of additional sources of metric information.

COM-74-50184/2 MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Design, Siting, and Construction of Low-Cost Housing and Community Buildings to Better Withstand Earthquakes and Windstorms
Final rept.
William F. Reps, and Emil Simiu. Jan 74, 153p Rept no. NBS-BSS-48
Paper copy available from GPO as C13.29/2:48.

Keywords: *Buildings, Environmental engineering, Storms, Earthquakes, Turkey, Peru, Philippine Islands, Developing countries, Earthquake resistant structures, Avalanches, Site surveys, Structural engineering, Disasters, *Earthquake engineering, *Wind pressure, *Housing, Low cost housing, Windstorms.

The report provides technical information regarding characteristics of materials and building systems, and discusses the structural performance of buildings subjected to the action of earthquakes and wind forces with specific reference to structures typical of developing countries. Potential ways are described in which structures can be made more resistant to such action. Siting considerations are discussed from a geological, seismic and climatological viewpoint, and recommendations relating to siting problems are made. Techniques of housing construction, both traditional and industrialized, are described and improvements resulting in better earthquake or windstorm resistance are suggested. Building codes, their improvement and their enforcement are also discussed.

COM-74-50522/3 MF A01
Economic Development Administration, Washington, DC.
The Potential of Handcrafts as a Viable Economic Force - An Overview
May 74, 56p
Paper copy available from GPO

Keywords: Crafts, Marketing, Craftsmen, Skills, Financing, Designers, Economic factors, Operating costs, Blighted areas, *Handicrafts, Design crafts.

Handcrafts are considered to be an emerging and viable economic force, but their impact must be viewed relative to their setting. They often may generate jobs and income in areas that offer only meager alternatives. Handcrafts preserve our national folk heritage, contribute to our cultural traditions, and provide both recreational and therapeutic benefits to handicapped persons, the elderly, and others. Crafts can be produced, individually, by sophisticated urban-oriented artisans and by isolated mountaineers; by urban or rural cooperatives; by such ethnic groups as Indians, Mexican-Americans, and Alaskan Natives; and by craft centers, where volume production is combined with hand skills. There is growing market for quality crafts that can be supplied in quantity and dependably.

COM-75-10394/5 PC A08/MF A01
Puerto Rico Univ., Mayaguez. Dept. of Marine Sciences.
The Development of Cultures of the Channel Catfish 'Ictalurus punctatus' and 'Tilapia' Species in Puerto Rico
Final rept. 1 Jul 71-30 Jun 74
Francisco A. Pagan-Font. 30 Jun 74, 174p NOAA-75022110

Keywords: Catfishes, Aquaculture, *Fishes, Fisheries, Puerto Rico, Cultures(Biology), Recommendations, Salinity, Temperature, Feeding stuffs, Channel catfish, Ictalurus punctatus, Tilapia aurea.

Polyculture of channel catfish with Tilapia spp. was demonstrated. Recommended harvest size for catfish is 350 g obtainable in one year. T. aurea can produce three crops per year at a weight of over 68.1 g per fish. Sugar mill waste, rum and beer distillery wastes, tuna stickwater, pharmaceutical yeasts, and chicken manure were found to be of possible use as local fish feeds. Raceway cultures were found to be expensive and are not recommended at this time. In polyculture trials it was found that 9000 kg per hectare per year may be attained. The Lajas Valley appears to be most suitable for fish culture where some 700 acres, which is too saline for agricultural purposes, could be used.

COM-75-11378/7 PC A04/MF A01
National Marine Fisheries Service, Gloucester, Mass. Atlantic Fishery Products Technology Center.
A Study: Expanded Processing Techniques, Production Costs and Market Survey of Underutilized Fish Species
Technical assistance rept.
J. M. Mendelsohn. May 74, 60p* EDA-75-05
Grant EDA-01-6-09131-2

Keywords: *Fishes, Economic development, Market research, Abundance, *Food processing, Food consumption, Food preparation, Food storage, Drying, Feasibility, Acceptability, Merluccius bilinearis, Market surveys, Fish products, Technical assistance, Fish cakes.

The program was carried out by the Atlantic Fishery Products Technology Center (AFPTC), National Marine Fisheries Service (NMFS) under a one-year contract with the Economic Development Administration (EDA), U.S. Department of Commerce. The contract called for implementing the results of a previous study (A Study to Develop New Products from Whiting or Other Underutilized Species,) in which new products having commercial potential were prepared on a laboratory scale from seasonally abundant and underutilized whiting (Merluccius bilinearis) and similar species.

COM-75-50001/7 MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Development of Improved Design Criteria for Low-Rise Buildings in Developing Countries to Better Resist the Effects of Extreme Winds. Proceedings of a Workshop Held at the Dr. Paulino J. Garcia Memorial Hall, National Science Development Board, Manila, Philippines, November 14-17, 1973
Building science series rept.
Noel J. Raufaste, Jr, and Richard D. Marshall. Oct 74, 169p* Rept no. NBS-BSS-56
Grant PASA-TA(CE)-04-73
Library of Congress Catalog Card no. 74-600158.
Paper copy available from GPO as C13.29/2:56.

Keywords: *Buildings, *Wind pressure, Storms, Developing countries, Meetings, Design criteria, Dynamic structural analysis, Hurricanes, Damage control, Management information systems, Recommendations, Wind resistant buildings, Low rise buildings.

A 1973 international workshop held in Manila, Philippines, addressed the state-of-the-art in mitigating building damages from winds. The workshop was jointly sponsored by the United States Agency for International Development (USAID), a Philippine advisory committee, and the U.S. National Bureau of Standards (NBS). This report presents the proceedings derived from the workshop. The proceedings present recommendations, the workshop program, five reports, and nine technical articles. The technical articles addressed four primary topics which were used to guide subsequent workshop discussions. The topics ad-

dressed were; wind and aerodynamics, structural related technology, socio-economic and architectural considerations, and codes and standards. The results of the workshop suggest improved building practices for developing countries and the development of improved design criteria for low-rise buildings to better resist the effects of extreme winds.

CONF-760536-1 PC A02/MF A01
Oak Ridge National Lab., TN.
Potential for Energy Conservation Technology Transfer
E. C. Hise. 1976, 11p
Southern interstate nuclear board meeting, Winston-Salem, North Carolina, United States of America (USA), 24 May 1976.

Keywords: Commercial buildings, *Energy conservation, Energy consumption, Houses, Technology transfer, Air conditioning, Capital, Economics, Efficiency, Engineering, Environmental effects, Furnaces, Government policies, Heat pumps, Modifications, Sociology, Space heating, Standards, Thermal insulation, Water heaters, *Buildings, Residential buildings, Hot water heating.

The segment of energy consumption related to space conditioning and water heating in residential, commercial, and institutional buildings is discussed specifically. Within this constraint building energy consumption is discussed, considering three choices: drastic alteration of life style; even greater energy operating costs; or relatively large capital expenditures to reduce building energy consumption. It is concluded that the average existing residence can, through insulation, reduce its energy consumption to 60 percent of present for an expenditure of $500 to $1000 and a pay back of 5 to 10 years. The average existing commercial or institutional building can save even more, although their construction may require less commonplace insulation methods than residences. New construction can show greater energy savings at little or no additional construction cost. From data contained in reports in the bibliography (10 items), the author again concludes that the average existing residential heating/cooling system (equipment) can be modified or replaced to reduce its energy consumption to 60 percent or even 40 percent of the present at a cost of a few hundred to $3000 as a function of the problem. The possible savings in commercial and institutional buildings are equally great. (ERA citation 01:019507)

CONF-761157- PC A07/MF A01
Washington Scientific Marketing, Inc., DC.
Proceedings of the Energy Research and Development Administration Workshop on Fluid Waste Heat Recovery and Utilization
1976, 129p
Workshop on fluid waste, heat recovery and utilization, Washington, District of Columbia, United States of America (USA), 17 Nov 1976.

Keywords: Heat recovery, Industrial plants, *Waste heat utilization, *Energy conservation, Meetings, Agriculture, Heat exchangers, Heat storage, Heat transfer, Research programs, Thermal effluents, Uses, Waste heat.

A workshop on Fluid Waste Heat Recovery and Utilization was held in Washington, D.C. to develop specific ideas for research and development relating to the utilization of industrial process fluid waste streams at temperatures from 100 exp 0 to 200 exp 0 F. The participants represented the agricultural, chemical, food processing, metals, textiles, petroleum, and paper industries and community systems. The broad topics considered included heat recovery techniques and equipment; decontamination of waste heat media; uses of waste heat to enhance biological processes, e.g., in aquaculture and greenhouses; space heating; heat storage and transport; and the modification of industrial processes to eliminate waste heat streams. The participants formulated 93 specific research and development ideas. (ERA citation 02:052230)

CONF-770140- PC A13/MF A01
Illinois Univ. at Urbana-Champaign.
Solar Grain Drying Conference Proceedings
G. C. Shove. Oct 77, 286p
National solar grain drying conference, Champaign, IL, USA, 11 Jan 1977.

Keywords: Cereals, *Solar drying, Meetings, Agriculture, Leading abstract, Seeds, *Grains (Food), Crop driers, Grain crops, Proceedings.

Thirty papers are included. A separate abstract was prepared for each paper. (ERA citation 03:042498)

CONF-770367- PC A15/MF A01
Ohio Agricultural Research and Development Center, Wooster.
Proceedings of a Conference on Solar Energy for Heating Greenhouses and Greenhouse-Residential Combinations
T. E. Bond, L. C. Godbey, and H. F. Zornig. Nov 77, 350p
Conference on solar energy for greenhouses and greenhouse-residential combinations, Cleveland, OH, USA, 20 Mar 1977.

Keywords: *Greenhouses, *Solar heating systems, Meetings, Agriculture, Food industry, Leading abstract.

Seventeen papers are included. A separate abstract was prepared for each for Energy Research Abstracts (ERA); eight are included in Energy Abstracts for Policy Analysis (EAPA). (ERA citation 03:030595)

CONF-760249- PC A17/MF A01
Altas Corp., Santa Cruz, CA.
Use of Solar Energy for the Cooling of Buildings
E. F. Clark, and F. de Winter. Oct 78, 393p
Contract EG-77-C-02-4576
Workshop on the use of solar energy for the cooling of buildings, San Francisco, CA, USA, 15 Feb 1978.

Keywords: *Buildings, *Solar cooling systems, California, Leading abstract, Meetings, Proceedings.

Separate abstracts were prepared for the 46 papers included. (ERA citation 05:030473)

CONF-790432-(V.1) PC A23/MF A01
Texas Univ. at Austin.
Industrial Energy Conservation Technology
P. S. Schmidt. 1979, 545p
Contract FC01-76IR08151
Conference on industrial energy conservation technology and exhibition, Houston, TX, USA, 22 Apr 1979.

Keywords: *Energy conservation, Industry, Energy efficiency, *Energy management, Industrial plants, Leading abstract, Meetings.

A separate abstract was prepared for each of 51 papers included in this volume, Vol. 1, of the proceedings. Twenty-one of these abstracts will appear in Energy Abstracts for Policy Analysis. (ERA citation 05:032472)

CONF-790432-(V.2) PC A23/MF A01
Texas Univ. at Austin.
Industrial Energy Conservation Technology
P. S. Schmidt. 1979, 541p
Contract FC01-76IR08151
Conference on industrial energy conservation technology and exhibition, Houston, TX, USA, 22 Apr 1979.

Keywords: *Energy conservation, Industry, Energy efficiency, *Energy management, Industrial plants, Leading abstract, Meetings.

A separate abstract was prepared for each of 59 papers included in this volume, Vol. II, of these proceedings. Thirty of the papers were selected for Energy Abstracts for Policy Analysis. (ERA citation 05:032473)

CONF-7905109- PC A14/MF A01
Iowa State Univ., Ames.
Wind Energy Applications in Agriculture
H. H. Kluter, and L. H. Soderholm. 1979, 325p
Wind energy application in agriculture conference, Ames, IA, USA, 15 May 1979.

Keywords: Wind turbines, *Agriculture, Farms, Leading abstract, *Wind energy, Meetings.

Separate abstract are included for each of the papers presented concerning the use of wind turbines in agriculture. (ERA citation 06:007650)

CONF-790520- PC A99/MF A01
Department of Energy, Washington, DC. Office of Transportation Programs.
Third International Symposium on Alcohol Fuels Technology
Apr 80, 714p
Contract FG03-79CS50015
International symposium on alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

Keywords: Alcohol fuels, Biomass, *Environmental impacts, Leading abstract, Meetings, Production, *Alcohols, *Fuels, Safety, Socio-economic factors.

At the opening of the Symposium, Dr. Sharrah, Senior Vice President of Continental Oil Company, addressed the attendees, and his remarks are included in this volume. The Symposium was concluded by workshops which addressed specific topics. The topical titles are as follows: alcohol uses; production; environment and safety; and socio-economic. The workshops reflected a growing confidence among the attendees that the alcohols from coal, remote natural gas and biomass do offer alternatives to petroleum fuels. Further, they may, in the long run, prove to be equal or superior to the petroleum fuels when the aspects of performance, environment, health and safety are combined with the renewable aspect of the biomass derived alcohols. Although considerable activity in the production and use of alcohols is now appearing in many parts of the world, the absence of strong, broad scale assessment and support for these fuels by the United States Federal Government was a noted point of concern by the attendees. The environmental consequence of using alcohols continues to be more benign in general than the petroleum based fuels. The exception is the family of aldehydes. Although the aldehydes are easily suppressed by catalysts, it is important to understand their production in the combustion process. Progress is being made in this regard. Of course, the goal is to burn the alcohols so cleanly that catalytic equipment can be eliminated. Separate abstracts are prepared for the Energy Data Base for individual presentations. (ERA citation 05:033415)

CONF-790541-19 PC A02/MF A01
Idaho National Engineering Lab., Idaho Falls.
Manufactured Solar Home
M. P. Scofield, A. S. Lau, K. H. Liebelt, and N. R. Shinn. 1979, 6p
Contract EY-76-C-07-1570
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Keywords: *Houses, *Solar cooling systems, *Solar heating systems, Computer codes, Control systems, Data acquisition systems, Design, Heat exchangers, Idaho, Mathematical models, Monitoring, Performance, Rock beds, Sensible heat storage, Solar air conditioning, Solar air heaters, Solar space heating.

Two nearly identical manufactured solar houses were designed and built in Idaho. The solar system was designed to be eventually offered as an option on any home manufactured by Boise Cascade. The active solar heating and cooling system uses simple air collectors, rock storage, and a heat exchanger to preheat hot water. Summer cooling is provided by blowing cool, night air through the rock bed and then circulating house air through the cool rocks as needed. Both houses are being monitored for two years to obtain dynamic heating and cooling system performance. The data will be used to modify computer models such as TRNSYS to obtain more accurate performance predictions. Initial predictions of performance and cost indicate that positive monthly savings will be achieved. (ERA citation 04:046213)

CONF-791056- PC A99/MF A01
Corps of Engineers, Washington, DC.
Waterpower '79: The First International Conference on Small-Scale Hydropower
1979, 884p
Waterpower 79 international conference: small scale hydropower, Washington, DC, USA, 1 Oct 1979.

Keywords: *Hydroelectric power, Leading abstract, Meetings.

Ninety-seven papers were presented at the meeting. A separate abstract was prepared for each of 94 papers. Three papers appeared previously in Energy Research Abstracts. Fifty-five of the papers will appear in Energy

Abstracts for Policy Analysis (EAPA). (ERA citation 06:018147)

CONF-791056-3 MF A01
Washington Univ., Seattle. Coll. of Fisheries.
Fish Passage and Small Hydroelectric Technology: A State of the ART Review
M. C. Bell, and S. G. Hildebrand. 1979, 8p
Contract W-7405-ENG-26
Waterpower 79 international conference: small scale hydropower, Washington, DC, USA, 1 Oct 1979.
Microfiche copies only.

Keywords: *Dams, Fish passage facilities, Low-head hydroelectric power plants, Design, *Fishes, *Hydroelectric power, Operation, Safety, Electric power plants, State of the art.

One of the most frequently raised environmental issues that may affect the development of small hydroelectric technology is the possible requirement of fish passage facilities at existing dams. The need for these facilities may be a significant factor in determining the economic feasibility of small hydro projects. Some preliminary results of an ongoing study reviewing fish passage technology relating to small hydro development are described. Types of structures available to move upstream migrating fish around dams, and downstream passage facilities are discussed. Some basic design considerations for successful operation of upstream passage facilities and basic cost figures are presented. (ERA citation 05:006704)

CONF-8003145-(Exc.) PC A08/MF A01
Department of Energy. Seattle, WA. Region X.
Small-Hydroelectric Workshop
Mar 80, 168p
Small hydroelectric workshops, Boise, ID, USA, 18 Mar 1980.

Keywords: Pacific northwest region, Small-scale hydroelectric power plants, *Hydroelectric power, Dams, Feasibility studies, Financing, Inventories, Licensing, Meetings, Power potential, Retrofitting, United States.

This workshop on small-scale hydroelectric power development covered the following subjects: the role of the Department of Energy in small hydro development throughout the US and specifically the DOE loan program for this purpose; the role of the Corps of Engineers in small-scale hydro development in the Pacific Northwest; an inventory of existing non-power dams in Idaho, Wyoming, and Oregon with an indication of their developable potential; the economics of small-scale hydro development with listings of the applicable financial assistance programs of 7 federal agencies; site assessment; how to make loan applications for feasibility studies; and licensing requirements and procedures. (ERA citation 06:028365)

CONF-800396-1 PC A02/MF A01
Tata Energy Research Inst., Bombay (India).
Supplementing the Energy and Plant Nutrient Requirements Through Organic Recycling
S. S. Mahdi, and R. V. Misra. 1980, 9p
National symposium on recycling of residues of agriculture and industry, Ludhiana, India, Mar 1980. Portions of Document are illegible

Keywords: *Agricultural wastes, Biological wastes, *India, Renewable energy sources, Agriculture, Animals, Biogas process, Conversion, Crops, Culture media, Fertilizers, Human populations, Manures, Nutrients, Organic compounds, Recycling, Soils, Solid wastes, *Bioconversion, *Animal wastes, *Waste recycling, Foreign technology.

In context of dwindling non-renewable energy resources and increasing health hazards because of environmental pollution, recycling of organic residues obtained through various sources like crops, animals, and human beings is becoming increasingly important. The organic residues obtained as wastes through these sources can be recycled effectively to meet scarce resources of energy and the plant nutrients, so vitally needed for our day-to-day activities and for raising agricultural production. Agriculture is the main stay of the Indian economy. Considerable quantities of crop residues available from agriculture can be utilized to serve as a source of organic fertilizers which not only provide plant nutrients but also improve soil health. The country has a large animal and human population. The animal and human wastes can be successfully used for production of energy and organic fertilizer by routing through biogas system. There is a need to develop an integrated energy and nutrient supply program. An action program is outlined. (ERA citation 05:033791)

CONF-800483-(V.1) PC A20/MF A01
Texas Industrial Commission, Austin.
Industrial Energy Conservation Technology
P. S. Schmidt, and M. A. Williams. 1980, 453p
Contract FC01-75IR08141
Annual conference on industrial energy conservation technology and exhibition, Houston, TX, USA, 13 Apr 1980.

Keywords: *Energy conservation, Energy efficiency, Industrial plants, Industry, Leading abstract, Meetings, Proceedings, Technology utilization.

A separate abstract was prepared for each of the 60 papers included in this volume, all of which will appear in Energy Research Abstracts (ERA); 21 were selected for Energy Abstracts for Policy Analysis (EAPA). (ERA citation 06:018849)

CONF-8006100-1 PC A03/MF A01
California Univ., Riverside. Dept. of Soil and Environmental Sciences.
Uses of Tree Legumes in Semi-Arid Regions
P. Felker. 1980, 29p
Contract FG01-78ET20023
Symposia on legumes, Bloomington, IN, USA, Jun 1980.

Keywords: Leguminosae, Trees, Animal feeds, *Arid land, Deserts, *Leguminous plants, *Food, *Fuels, Uses.

Uses of tree legumes in semi-arid and arid regions are reviewed. This review is divided into sections according to the following general use categories: fuels; human food; livestock food; to increase yields of crops grown beneath their canopies;and control of desertification. (ERA citation 05:033420)

CONF-800814-11 PC A02/MF A01
Oak Ridge National Lab., TN.
Environmental and Health Aspects of Biomass Energy Systems
H. M. Braunstein, and F. C. Kornegay. 1980, 20p
Contract W-7405-ENG-26
180. American Chemical Society meeting/2. chemical congress of the North American Continent, Las Vegas, NV, USA, 24 Aug 1980.

Keywords: *Wood, Wood burning appliances, Air quality, Carbon monoxide, Combustion, Emission, *Environmental impacts, Health hazards, Hydrocarbons, Particles, Residential sector, Smokes, *Wood stoves.

In a recent study undertaken to ensure the early incorporation of environmental considerations in decisions concerning biomass-to-energy systems, a number of issues emerged indicating the need for early attention to environmental, socioeconomic and health concerns. Both production of biomass as well as conversion can lead to environmental impact, and although most impacts will be site-specific, some generic effects can be identified. The most important potential impacts arise first, from the need for large-scale commitment of resources for production, and second, from uncontrolled widespread small-scale utilization. Because biomass-related impacts cover a very broad spectrum of materials, processes, end products, and effects, the discussion presented here, except for an overview of generic effects and comment on production impacts, will be directed primarily to those resulting from residential wood combustion. (ERA citation 05:0[illegible]116)

CONF-8009108- PC A08/MF A01
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Alternate Sources of Energy
1980, 165p
Alternate sources of energy conference, New York, NY, USA, 29 Sep 1980.

Keywords: *Alcohols, *Geothermal energy, Municipal wastes, Renewable energy sources, Solar cell arrays, *Solar energy, *Wind energy, Electric-powered vehicles, Leading abstract, Meetings.

Eleven papers are included. A separate abstract was prepared for each for Energy Research Abstracts (ERA); seven were selected for Energy Abstracts for Policy Analysis. (ERA citation 06:010459)

CONF-8010100-2 PC A02/MF A01
EG and G Idaho, Inc., Idaho Falls.
Feedstocks for Alcohol Fuel Production
N. E. Stanley. 1980, 5p
Contract AC07-76ID01570
Eastern Idaho alcohol production workshop, Idaho Falls, ID, USA, 17 Oct 1980.

Keywords: Alcohol fuels, Chemical feedstocks, *Alcohols, By-products, Cellulose, Cereals, *Fuels, Fruits, Municipal wastes, Potatoes, Production, Sorghum, Straw, Sugar beets.

An overview is presented of the potential feedstock materials produced in the mountain states. Data are provided on feedstock yields, costs, and by-product values. (ERA citation 06:002166)

CONF-801213-(Prelim.) PC A19/MF A01
Conference on Alternative State and Local Policies, Washington, DC.
Local Alternative Energy Futures: Developing Economies/Building Communities
M. Totten, B. Glass, M. Freedberg, and L. Webb.
Dec 80, 427p
Contract FG01-80CS10083
Local alternative energy futures-developing economy building communities conference, Austin, TX, USA, 11 Dec 1980.

Keywords: Communities, Energy efficiency, *Energy source development, Local government, *Community development, Renewable energy sources, Economic development, Energy conservation, Financial incentives, Financing, Leading abstract, Meetings, Regulations, Standards.

A separate abstract was prepared for each of the three parts of the conference. A sufficient range of information is presented to enable interested parties to explore the viable alternatives for community self-sufficiency. The parts are entitled: Financial Incentives and Funding Sources; Standards, Regulations, Mandates, Ordinances, Covenants; and Community/Economic Development. (ERA citation 06:011043)

CONF-810140-2 PC A02/MF A01
Oak Ridge National Lab., TN.
Community-Based Assessment and Planning of Energy Futures
S. A. Carnes. 1981, 17p
Contract W-7405-ENG-26
Community energy planning conference, Gatlinburg, TN, USA, 20 Jan 1981.

Keywords: Communities, *Energy conservation, Renewable energy sources, Decision making, *Community development, Demonstration programs, Energy supplies, Environmental effects, Government policies, Information, Institutional factors, Kentucky, Local government, Massachusetts, New York, Ohio, Planning, Socio-economic factors, *Solar energy, Technology assessment.

The Decentralized Solar Energy Technology Assessment Program (DSETAP) is discussed. In this program four communities were involved in an assessment of the compatibility of diverse conservation and renewable energy-supply technologies and community values and goals and in community planning for the implementation of compatible energy demand and supply alternatives. The approach taken by these communities has several basic components, including: (1) recruiting and organizing for the assessment planning process; (2) collection and analysis of data related to community energy use and indigenous renewable-energy resources; (3) creation and maintenance of a community education and information program; (4) development of policies favorable to the development of preferred community futures; and (5) development of implementation or action strategies. How these components were carried out by the four communities in the DSETAP is reviewed. Particular attention is paid to a number of important issues which were raised during the course of the DSETAP, including the role of public participation, group decision-making techniques, the

role of technical information in citizen and group decision-making, and linkages between assessment planning and the relevant policy process. (ERA citation 06:023672)

COO-2390-15 PC A02/MF A01
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Needs and Opportunities for Ceramic Science and Technology
W. D. Kingery. 1976, 12p Rept no. CONF-7605158-1
Contract EY-76-S-02-2390
International meeting on modern ceramic technology, Rimini, Italy, 26 May 1976.

Keywords: *Ceramics, Industrial plants, Capital, Demand factors, Energy consumption, Energy demand, Environmental effects, Manufacturing, Materials, Resources, Technology assessment, Investments, Manpower, Energy requirements, Fabrication, Ceramics industry, Industries.

There clearly seems to be a consensus developing that technological requirements, including ceramics, will be sought in the next few decades with regard to (1) substituting common and readily available materials for rarer and therefore diminishing resources, (2) making strong efforts to either conserve energy or develop new sources of energy, (3) protecting the environment, and (4) providing opportunities for more worker satisfaction. An attempt is made to relate these objectives to needs and opportunities for ceramics. The following considerations are discussed in reference to the ceramic industry: labor-capital requirements, materials resource requirements, energy requirements, environmental requirements, fabrication requirements, and new product requirements. (ERA citation 02:057032)

COO/2829-1 PC A06/MF A01
InterTechnology Corp., Warrenton, Va.
Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume I
7 Feb 77, 120p
Contract EY-76-C-02-2829

Keywords: Agriculture, Industrial plants, *Process heat, *Solar collectors, Solar cookers, Solar drying, Solar furnaces, Solar kilns, Solar stills, Solar water heaters, Automobile industry, Boilers, Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar dryers, Synthetic fuels industry, Technology assessment, *Solar heating systems, Textile industry, Industries, *Solar water heating.

The process heat data base assembled as the result of this survey includes specific process applications from 78 four-digit Standard Industrial Classification (SIC) groups. These applications account for the consumption of 9.81 quadrillion Btu in 1974, about 59 percent of the 16.6 quadrillion Btu estimated to have been used for all process heat in 1974. About 7 exp 1 / sub 2 percent of industrial process heat is used below 212 exp 0 F (100 exp 0 C), and 28 percent below 550 exp 0 F (288 exp 0 C). In this study, the quantitative assessment of the potential of solar thermal energy systems to provide industrial process heat indicates that solar energy has a maximum potential to provide 0.6 quadrillion Btu per year in 1985, and 7.3 quadrillion Btu per year in 2000, in economic competition with the projected costs of conventional fossil fuels for applications having a maximum required temperature of 550 exp 0 (288 exp 0 C). A wide variety of collector types were compared for performance and cost characteristics. Performance calculations were carried out for a baseline solar system providing hot water in representative cities in six geographical regions within the U.S. Specific industries that should have significant potential for solar process heat for a variety of reasons include food, textiles, chemicals, and primary metals. Lumber and wood products, and paper and allied products also appear to have significant potential. However, good potential applications for solar process heat can be found across the board throughout industry. Finally, an assessment of nontechnical issues that may influence the use of solar process heat in industry showed that the most important issues are the establishment of solar rights, standardization and certification for solar components and systems, and resolution of certain labor-related issues. (Volume 1 of 3 volumes.). (ERA citation 02:058733)

COO/2829-2 PC A99/MF A01
InterTechnology Corp., Warrenton, Va.
Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume II
7 Feb 77, 1234p
Contract EY-76-C-02-2829

Keywords: Industrial plants, *Process heat, Solar air heaters, *Solar collectors, Solar cookers, Solar dryers, Solar furnaces, Solar kilns, Solar stills, Solar water heaters, Agriculture, Automobile industry, Boilers, Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar drying, Synthetic fuels industry, *Solar heating systems, *Solar water heating.

This report is Volume 2 of three volumes. For abstract see Volume I, report COO/2829--1. (ERA citation 02:058734)

COO/2829-3 PC A99/MF A01
InterTechnology Corp., Warrenton, Va.
Analysis of the Economic Potential of Solar Thermal Energy to Provide Industrial Process Heat. Final Report, Volume III
7 Feb 77, 819p
Contract EY-76-C-02-2829

Keywords: Industrial plants, *Process heat, Solar air heaters, *Solar collectors, Solar cookers, Solar dryers, Solar furnaces, Solar kilns, Solar stills, Solar water heaters, Agriculture, Automobile industry, Boilers, Building materials, Chemical industry, Coal industry, Concentrating collectors, Cost, Economics, Environmental effects, Fertilizers, Financial incentives, Flat plate collectors, Food industry, Glass industry, Industry, Legal aspects, Life-cycle cost, Mathematical models, Meat industry, Metal industry, Mineral industry, Ore processing, Paper industry, Petroleum industry, Site selection, Solar cooking, Solar distillation, Solar drying, Synthetic fuels industry, *Solar heating systems, *Solar water heating.

This report is Volume 3 of three volumes. For abstract, see Volume I, report COO/2829--1. (ERA citation 02:058735)

COO/2917-3(V.1) PC A10/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Biological Conversion of Organic Refuse to Methane. Final Report, July 1, 1973--November 30, 1976
J. W. Brown, J. T. Pfeffer, and J. C. Liebman. Nov 76, 201p
Contract EY-76-S-02-2917

Keywords: *Methane, Municipal wastes, Additives, Anaerobic digestion, Biosynthesis, By-products, Calorific value, Cellulose, Centrifugation, Chemical reaction kinetics, Diagrams, Fermentation, Filtration, Flowsheets, Iron sulfates, Lignin, Liquid wastes, Nutrients, Performance testing, Recycling, Research programs, Residues, Sewage, Sludges, Slurries, Sodium hydroxides, Tables, Viscosity, *Bioconversion, *Waste Recycling, Synthetic fuels, Manufactured gas, Solid wastes, Refuse derived fuels.

In order to predict accurately the cost of producing methane from urban refuse, studies were initiated on the dewatering of the fermentor residue and the disposal of the residue from the system. Results of the research are reported under the following subject headings: fermentation system; rheological properties of reactor slurry; filterability of reactor effluent; residue dewatering--vacuum filtration; settleability of solids in the reactor effluent; settleability of sludges from centrate treatment; centrifugation of reactor effluent; leachate potential of dewatered reactor residue; calorific value of the reactor residue; residue incineration; the production of panelboards; caustic treatment of digester feed; and, treatment of filtrate--centrate. Appendixes A, B, D, and E are included; Appendix C, which includes computer programs and documentation, is bound separately as Volume II of this report. (ERA citation 03:011893)

COO/2917-3(V.2) PC A06/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Biological Conversion of Organic Refuse to Methane. Final Report, July 1, 1973--November 30, 1976
G. E. Quindry, J. C. Liebman, and J. T. Pfeffer. Nov 76, 109p
Contract EY-76-S-02-2917

Keywords: *Bioconversion, *Methane, Municipal wastes, Additives, Anaerobic digestion, Biosynthesis, Capital, Computer codes, Economics, Equipment, Fermentation, Mathematical models, Research programs, Sewage, Simulation, Sodium hydroxides, *Waste recycling, Synthetic fuels, Manufactured gas, Solid wastes.

In order to predict accurately the cost of producing methane from urban refuse, studies were initiated on the dewatering of the fermentor residue and the disposal of the residue from the system. Experimental procedures and data are reported in Volume I of this series; related computer programs and documentation are reported in Appendix C, bound separately as Volume II. This appendix contains detailed information on the simulation model. It is divided into five major sections; logic flow and notes, simulation results, definition of major program variables, program listing, and sample output. The section on simulation results includes an analysis of the system under various operating conditions. The program was implemented on the University of Illinois DEC-10 system. (ERA citation 03:009932)

COO/2917-5 PC A05/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Biological Conversion of Biomass to Methane. Annual Progress Report, June 1, 1976--May 31, 1977
J. T. Pfeffer. Jun 77, 78p
Contract EY-76-S-02-2917

Keywords: *Manures, *Methane, Anaerobic digestion, Bench-scale experiments, Biosynthesis, Cattle, Comparative evaluations, Configuration, Diagrams, Fermentation, Gas yields, Laboratory equipment, Tables, *Bioconversion, Manufactured gas, Solid wastes, Synthetic fuels.

A large scale laboratory system was constructed to evaluate the methane yields from various organic materials. The initial substrate for these studies was beef feed lot manure. Methane yields ranged from 0.11 to 0.259 m exp 3 per kg volatile solids fed with a fermentation temperature of 58 exp 0 C. The gas yield for a given manure was a function of retention time. However, fresh manure produced substantially more gas than manure that had been on the lots for several months. Retention times of 3.7 days and loadings of 8.76 kg per m exp 3 per day resulted in stable operation. The results of a separate study of the effect of reactor type on methane production showed that if a balanced population of organisms can be maintained in the initial stage, a multi-stage fermentation is more efficient than a complete-mix system. However, when the system is stressed, failure of the multi-stage system is more rapid. If the objective is to maximize the conversion of solids to methane, a staged system will produce more methane per unit volume of reactor. If the objective is to maximize methane production per unit volume of reactor, a single stage complete-mix reactor operating at near the critical retention time is required. (ERA citation 03:023375)

COO-2982-57 PC A04/MF A01
Arizona State Univ., Tempe. Coll. of Engineering Sciences.
Conversion of Cellulosic Wastes to Liquid Fuels
J. L. Kuester. Sep 80, 74p
Contract AS02-76CS40202

Keywords: Bagasse, Biomass, *Cellulose, Diesel fuels, Gasoline, Intermediate btu gas, Propanols, Synthetic petroleum, *Wood wastes, Catalysis, Chemical composition, Fischer-tropsch synthesis, Fluidized bed, Gasification, Liquefaction, Liquid fuels, Liquid wastes,

Optimization, Production, *Pyrolysis, Synthesis, *Automotive fuels, *Agricultural wastes.

The current status and future plans for a project to convert waste cellulosic (biomass) materials to quality liquid hydrocarbon fuels is described. The basic approach is indirect liquefaction, i.e., thermal gasification followed by catalytic liquefaction. The indirect approach results in separation of the oxygen in the biomass feedstock, i.e., oxygenated compounds do not appear in the liquid hydrocarbon fuel product. The process is capable of accepting a wide variety of feedstocks. Potential products include medium quality gas, normal propanol, diesel fuel and/or high octane gasoline. A fluidized bed pyrolysis system is used for gasification. The pyrolyzer can be fluidized with recycle pyrolysis gas, steam or recycle liquefaction system off gas or some combination thereof. Tars are removed in a wet scrubber. Unseparated pyrolysis gases are utilized as feed to a modified Fischer-Tropsch reactor. The liquid condensate from the reactor consists of a normal propanol-water phase and a paraffinic hydrocarbon phase. The reactor can be operated to optimize for either product. The following tasks were specified in the statement of work for the contract period: (1) feedstock studies; (2) gasification system optimization; (3) waste stream characterization; and (4) liquid fuels synthesis. In addition, several equipment improvements were implemented. (ERA citation 06:004616)

COO-2982-67 PC A02/MF A01
Arizona State Univ., Tempe. Coll. of Engineering Sciences.
Conversion of Wood Residues to Diesel Fuel
J. L. Kuester. 1981, 13p Rept no. CONF-810237-1
Contract AS02-76CS40202
Annual wood energy program and contractor review meeting, Washington, DC, USA, 9 Feb 1981.

Keywords: Biomass, *Wood wastes, Alkanes, Boiling points, Calorific value, Catalytic reforming, *Fuels, Chemical composition, Chemical reactors, Density, Experimental data, Fischer-tropsch synthesis, Fluidized bed, Fuel oils, Gasification, Gasoline, Liquefaction, Physical properties, Propanols, *Pyrolysis, Pyrolytic gases, Yields.

The basic approach is indirect liquefaction, i.e., thermal gasification followed by catalytic liquefaction. The indirect approach results in separation of the oxygen in the biomass feedstock, i.e., oxygenated compounds do not appear in the liquid hydrocarbon fuel product. The general conversion scheme is shown. The process is capable of accepting a wide variety of feedstocks. Potential products include medium quality gas, normal propanol, paraffinic fuel and/or high octane gasoline. A flow diagram of the continuous laboratory unit is shown. A fluidized bed pyrolysis system is used for gasification Capacity is about 10 lbs/h of feedstock. The pyrolyzer can be fluidized with recycle pyrolysis gas, steam or recycle liquefaction system off gas or some combination thereof. Tars are removed in a wet scrubber. Unseparated pyrolysis gases are utilized as feed to a modified Fischer-Tropsch reactor. The liquid condensate from the reactor consists of a normal propanol-water phase and a paraffinic hydrocarbon phase. The reactor can be operated to optimize for either product. If a high octane gasoline is desired, the paraffinic fuel is passed through a conventional catalytic reformer. The normal propanol could be used as a fuel extender if blended with the hydrocarbon fuel products. Off gases from the downstream reactors are of high quality due to the accumulation of low molecular weight paraffins. (ERA citation 06:018255)

COO/2991-10 PC A10/MF A01
Dynatech R/D Co., Cambridge, MA.
Fuel Gas Production from Animal Residue. Dynatech Report No. 1551
E. Ashare, D. L. Wise, and R. L. Wentworth. 14 Jan 77, 210p
Contract EY-76-C-02-2991

Keywords: Anaerobic digestion, *Fuels, Fuel gas, *Manures, Biosynthesis, Cattle, Chemical reaction kinetics, Computer codes, Computers, Design, Diagrams, Economics, Energy balance, Equipment, Material balance, Materials handling, Mathematical models, *Methane, Net energy, Optimization, Production, Sewage, Tables, *Waste recycling, *Animal wastes, Synthetic fuels, Manufactured gas, Solid wastes.

A comprehensive mathematical model description of anaerobic digestion of animal residues was developed, taking into account material and energy balances, kinetics, and economics of the process. The model has the flexibility to be applicable to residues from any size or type of animal husbandry operation. A computer program was written for this model and includes a routine for optimization to minimum unit gas cost, with the optimization variables being digester temperature, retention time, and influent volatile solids concentration. The computer program was used to determine the optimum base-line process conditions and economics for fuel gas production via anaerobic digestion of residues from a 10,000 head environmental beef feedlot This feedlot at the conditions for minimum unit gas cost will produce 300 MCF/day of methane at a cost of $5.17/MCF (CH sub 4), with a total capital requirement of $1,165,000, a total capital investment of $694,000, and an annual average net operating cost of $370,000. The major contributions to this unit gas cost are due to labor (37 percent), raw manure (11 percent), power for gas compression (10 percent), and digester cost (13 percent). A conceptual design of an anaerobic digestion process for the baseline conditions is presented. A sensitivity analysis of the unit gas cost to changes in the major contributions to unit gas cost was performed, and the results of this analysis indicate areas in the anaerobic digestion system design where reasonable improvements could be expected so as to produce gas at an economically feasible cost. This sensitivity analysis includes the effects on unit gas cost of feedlot size and type, digester type, digester operating conditions, and economic input data. (ERA citation 03:011895)

COO-2991-17 PC A03/MF A01
Dynatech R/D Co., Cambridge, MA.
Fuel Gas Production from Animal Waste. Phase I. Annual Summary Report, May 17, 1976--May 17, 1977
E. Ashare, R. L. Wentworth, D. L. Wise, and D. C. Augenstein. 31 May 77, 30p
Contract EY-76-C-02-2991

Keywords: Fuel gas, *Manures, Anaerobic digestion, Biosynthesis, Carbon dioxide, Flowsheets, Production, Recommendations, Removal, Research programs, Scrubbing, Technology assessment, *Animal wastes, *Methane, *Bioconversion, Synthetic fuels, Manufactured gas, Air pollution control, Solid wastes.

Quarterly coordination and review meetings were held with contractors in the area of fuel gas from animal residue via anaerobic digestion. Site visits to individual contractors were made to discuss progress of work. An engineering and economic analysis was performed for an anaerobic digestion process for the production of fuel gas from animal wastes. A comprehensive engineering report was prepared describing this study. A study of processes for the removal of acid gases from digester gas has been initiated. This study is directed at reviewing the technology and assessing the technical and economic feasibility of gas scrubbing technology for removal of CO sub 2 from digester gas. Proposals submitted to ERDA in the field of fuel gas from biomass were reviewed and evaluated. (ERA citation 03:009864)

COO/2991-19 PC A07/MF A01
Dynatech R/D Co., Cambridge, MA.
Anaerobic Digestion Technology. Quarterly Progress Meeting, Ithaca, New York, June 20--22, 1977
Nov 77, 136p
Contract EY-76-C-02-2991

Keywords: Anaerobic digestion, Leading abstract, Research programs, *Bioconversion.

Summaries of the current status of research on anaerobic digestion technology are presented. The fourteen projects reported on range in subject matter from the fundamentals and mechanisms of anaerobic digestion to the construction and operation of demonstration plants. Separate abstracts were prepared for each summary of research progress. (ERA citation 03:026005)

COO-2991-28 PC A08/MF A01
Dynatech R/D Co., Cambridge, MA.
Fuel Gas Production from Animal and Agricultural Residues and Biomass. Seventh Quarterly Coordination Meeting, Seattle, Washington, January 9--10, 1978
D. L. Wise, and R. L. Wentworth. 27 Jan 78, 156p
Contract EY-76-C-02-2991

Keywords: *Agricultural wastes, *Manures, *Bioconversion, *Methane, Anaerobic digestion, Biosynthesis, Research programs, *Animal wastes,*Waste recycling, Biomass, Synthetic fuels, Manufactured gas, Meetings, Solid waste disposal.

A regular coordination meeting, the seventh in a quarterly series, was held of the "methane production" group of the Fuels from Biomass Systems Branch, U.S. Department of Energy. The meeting was held in Seattle, Washington in order to site visit the Monroe, Washington anaerobic digester facility operated by Ecotope Group, Inc. In addition, progress reports were presented from all contractors. A list of attendees, the working schedule, and the progress reports and special topical reports presented are included in the following. Separate abstracts were prepared for the progress and special topical reports. (ERA citation 04:005417)

COO-4094-1 PC A05/MF A01
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Photovoltaic Power in Less Developed Countries
D. V. Smith. 24 Mar 77, 92p
Contract EY-76-C-02-4094

Keywords: Developing countries, *Irrigation, Solar cell arrays, *Solar water pumps, Communities, Demonstration programs, Diesel engines, Drinking water, Economics, Electric power, Feasibility studies, Lighting systems, Photovoltaic conversion, Pumps, Rural populations, Solar cells, Television, *Water pumps, *Photovoltaic power system.

The potential of solar photovoltaic power in the third world (less developed countries) is analyzed. Application of irrigation systems powered by photovoltaics in Bangladesh, Chad, India, and Pakistan, plus an economic analysis of a photovoltaic-powered village in northern India indicate solar energy is competitive with the least-cost fossil-fuel alternatives. The most cost-effective method for specific geographical locations can be determined by field testing based on the case history data reported. (ERA citation 02:045245)

COO-4094-49 PC A02/MF A01
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
PV-Powered Microirrigation Systems
R. W. Matlin. 1979, 5p Rept no. CONF-790541-48
Contract EY-76-C-02-4094
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Keywords: *Irrigation, *Photovoltaic power system, Computerized simulation, Dc systems, Efficiency, Egyptian arab republic, Electric motors, Farms, India, Performance, Power range 100-1000 kw, Water pumps.

Tens of millions of farmers currently subsist on small farms below two hectares in size. The increasing cost of animal irrigation coupled with decreasing farm size and the lack of a utility grid or acceptable alternate power sources is causing interest in the use of solar photovoltaic for these very small (subkilowatt) water pumping systems. The attractive combinations of system components (array, pump, motor, storage, and controls) have been identified and their interactions characterized in order to optimize overall system efficiency. Computer simulations as well as component tests were made of systems utilizing flat plate and low concentration arrays, direct-coupled and electronic impedance matching controls, fixed and incremental (once or twice a day) tracking, dc and ac motors, and positive displacement, centrifugal and verticle turbine pumps. The results of these analyses and tests are presented for Orissa, India and Cairo, Egypt, and include water volume pumped as a function of time of day and year. Finally, a description and operational data is given for the prototype unit that was developed as a result of the previous analyses and tests. (ERA citation 04:054323)

COO-4151-2 PC A06/MF A01
Woods Hole Oceanographic Institution, MA.

Fuels from Solar Energy: Photosynthetic Systems–State of the Art and Potential for Energy Production
J. C. Goldman. Jul 78, 124p
Contract EG-77-S-02-4151

Keywords: Unicellular algae, *Algae, Aquaculture, Cultivation techniques, Photosynthesis, Ponds, Productivity, Reviews, Single cell protein, Solar energy conversion, *Bioconversion, State of the art, Biomass, Biological industrial waste treatment, Life support systems, Chemical feedstocks, Synthetic fuels, Forecasting.

Research on the mass culturing of microalgae has been carried out over the past 30 years in many parts of the world. Today there are numerous potential applications for algal mass cultures including protein production, wastewater treatment, water renovation, closed life-support systems, production of commercial chemicals, aquaculture, and bioconversion of energy. Photosynthetic yields over 30 gr dry wt m exp -2 day exp -1 have been attained on occasion in many locations for short periods and yields between 15 to 25 gr dry wt m exp -2 day exp -1 for longer periods are now common. This apparent upper limit in productivity is not coincidental. Under outdoor conditions peak yields are possible only under conditions of light limitation. Photosynthetic algae absorb light energy and convert it to stored chemical energy under rigid adherence to the laws of thermodynamics. By examining the basic physics of photosynthesis, it is possible to clearly demonstrate that under conditions of full sunlight in the most ideal locations maximum yields of 30 to 40 gr m exp -2 day exp -1 can be expected. For long-term operation of large-scale outdoor cultures, many bioengineering factors are involved and realistic yields considerably less than the maximum potential can be anticipated. Manipulation of the two independent variables, flow rate and depth, is the key to maximizing yields for varying outdoor sunlight intensities. Future applications for algal mass cultures will probably be restricted to small well-managed systems for solving specific environmental problems in individual communities and not on the grand scale envisaged in the past. (ERA citation 04:025921)

COO-4225-1 PC A10/MF A01
Illinois Univ. at Urbana-Champaign. Office of Energy Research.
Fuels from Biomass Symposium
J. T. Pfeffer, and J. J. Stukel. 1977, 220p Rept no. CONF-770481-
Contract EG-77-C-02-4225
Fuels from biomass symposium, Champaign, IL, USA, 18 Apr 1977.

Keywords: *Bioconversion, Biomass, Meetings, Combustion, Growth, Thermochemical processes, *Fuels, Synthetic fuels, Manufactured gas.

The thirteen papers presented are compiled. Each was individually prepared for inclusion into the EDB data base. (ERA citation 04:007684)

COO-4531-6 PC A06/MF A01
Illinois Inst. of Tech., Chicago.
Beneficial Utilization of Waste Heat from Power Plants in Wastewater Treatment Systems
S. N. Ni, and A. W. Obayashi. Jun 79, 115p
Contract EC-77-S-02-4531

Keywords: Fossil-fuel power plants, Sewage, *Waste heat utilization, Waste processing plants, *Waste water, Economics, Energy conservation, Municipal wastes, Waste heat, Water pollution control, Sewage treatment, Sludge digestion, Anaerobic processes.

A number of wastewater treatment processes were analyzed for possible benefit in using waste heat from co-located steam-electric power plants. Three levels of treatment standards were considered, ranging from secondary treatment to stricter tertiary requirements which involve nutrient removal. Three sizes of treatment plants were analyzed, ranging from those serving 33,000 to 2,000,000 population. The processes analyzed included activated sludge, trickling filter, rotating biological contactors and the Bardenpho process. In the study, a fraction of the condenser discharge was considered mixed with primary-treated wastewater, thereby accelerating the biological secondary-treatment processes at the expense of dilution. In each case, the most cost-effective fraction of condenser flow to be utilized was determined. After treatment, a portion of the mixture would be returned to the power plant in order to recycle the corresponding condenser discharge and provide the necessary evaporative makeup for the cooling system. The balance of the mixture would constitute the water product of the treatment plant. The benefit of waste heat used to replace fuel oil in sludge digesters was also analyzed. In the case of the lowest effluent standards (Group 1), the most cost-effective secondary treatment process was activated sludge without waste-heat recycle because it is dominated by non-thermal considerations. Group 2 standards were favored by rotating biological contactors with waste-heat recycle. The most advanced Group 3 standards were optimally met by the Bardenpho process, also with waste-heat recycle. In all cases, anaerobic sludge digestion with waste heat in place of fuel oil was most economical. The overall savings in levelized annual costs ranged from 1.5% for the smallest plants to 9.9% for the largest plants, by using waste heat optimally as compared with optimal systems without waste heat. (ERA citation 05:010299)

D-726 948/3 PC A02 MF A01
Alabama Agricultural Experiment Station, Auburn.
Aquatic Weed Control in Fish Ponds with Chemical Methods
J. M. Lawrence. May 67, 13p
Sponsored in part by the Office of the Chief of Engineers (Army), Washington, DC. Presented at the World Symposium on Warm-Water Pond Fish Culture held in Rome (Italy) 15-16 May 66.

Keywords: *Plants(Botany), Control, *Lakes, Herbicides, Fishes, Toxicity, Algae, *Weed control, *Fisheries, Aquatic weeds.

Results of aquatic weed control research in fish ponds are reported. A listing of important algae genera and aquatic weed species, information on pond construction features of significance in aquatic weed control, and chemical control techniques are given. Data on fish toxicity and effective rates of application for use under pond conditions are presented for 2,4-D and silvex. (Author)

DE81023625 PC A16/MF A01
Acurex Corp., Mountain View, CA.
Application of Solar Energy to the Supply of Industrial-Process Hot Water
Jan 77, 363p Rept no. CDRL/PA-10
Contract AC03-76CS31218

Keywords: Food industry, *Solar heating systems, California, Design, Diagrams, Economic analysis, *Food processing, Installation, Performance, Solar process heat, Technology transfer, *Process heat.

The Solar System described was designed for installation at the Campbell Soup plant in Sacramento, where the solar heated water will be used to wash empty and full soup cans on a soup filling line. The detailed design and analysis of the solar energy hot water system for incorporation into the selected industrial process are described. Appendix A is a copy of the Preliminary Design and Performance Report and Appendix B is a copy of the energy Reduction and Economic Analysis Report. Detail drawings of the Solar System appear in Attachment 2. (ERA citation 06:028462)

DE81025792 PC A15/MF A01
Solar Energy Research Inst., Golden, CO.
Wind Power for Developing Nations
A. Mikhail. Jul 81, 331p Rept no. SERI/TR-762-966
Contract AC02-77CH00178

Keywords: Developing countries, Wind power, Wind turbines, Wind-powered pumps, Availability, *Wind energy, *Water pumps, *Turbines, Resource assessment, Specifications.

This report is designed to assist engineers, energy planners in developing countries, and donor agencies' personnel to assess the global potential of wind energy conversion systems (WECS). The cost effectiveness of WECS mainly depends on the availability of the wind resource, system power performance, and the comparative cost of alternate energy sources. Therefore, this report presents an overview of the global wind resource including observed zonal wind systems for each continent, available wind data, current wind maps, and on-going studies to assess the global wind potential. Also, because the most accurate method of assessing wind energy potential in a certain location is on-site measurement, the differences between commercially available wind sensors and recording equipments are discussed. A methodology is outlined for obtaining a match between machine and site characteristics for most cost-effective power production. The first three sections deal primarily with wind resource and wind-machine interaction. The final two sections cover wind machine technology and wind energy applications. (ERA citation 06:030415)

DE81025861 PC A06/MF A01
Mathtech, Inc., Princeton, NJ.
Harvesting of Close-Spaced Short-Rotation Woody Biomass
D. E. Cullen, and W. J. Barr. 15 Jun 80, 102p Rept no. DOE/ET/23133-T1
Contract AC01-78ET23133

Keywords: Biomass plantations, Biomass conversion plants, *Plants(Botany), *Bioconversion, Harvesting, Mathematical models, Optimization, Short rotation cultivation, Storage, Transport.

Efforts to date were concerned with identifying the characteristics of prospective woody biomass farms; the requirements for harvested wood to provide feedstock for various conversion processes; the characteristics of harvesting, collecting, transporting, and storing equipment as used by the forest products and agriculture industries; the applicability of the foregoing equipment to close spaced, short-rotation biomass farms; and the modelling of alternative systems linking biomass farms and biomass conversion plants. (ERA citation 06:028375)

DE81026073 PC A09/MF A01
General Electric Co., Philadelphia, PA.
Application of Solar Energy to the Supply of Hot Water for Textile Dyeing
22 Oct 76, 176p Rept no. DOE/CS/31220-T9
Contract AC03-76CS31220

Keywords: *Textile industry, Comparative evaluations, Economic analysis, Energy analysis, *Solar water heating, *Solar collectors, Energy consumption, Energy demand, Evacuated tube collectors, Flat plate collectors, Hot water, Performance, *Process heat, Solar process heat.

The hot water processing demand in textile dyeing and finishing mills throughout the US was studied. This information was employed in choosing the type solar collector system to afford a significant fuel savings in these mills. Economic pictures were developed from these inputs along with current fuel price scenarios, for initiating a plan for solarization in the industry. (ERA citation 06:030227)

DE81026222 PC A07/MF A01
Oklahoma State Univ., Stillwater. Engineering Energy Lab.
Egyptian Wind Energy Resources Study. Phase II. Final Report
W. L. Hughes. Nov 79, 139p Rept no. DOE/ET/20607-T1
Contract AC02-78ET20607

Keywords: *Egypt, *Wind energy, Availability, Data compilation, Monitoring, Resource assessment.

The data gathered in Egypt in Phase I of the program indicated favorable wind energy possibilities along the Mediterranean Coast west of Alexandria and along the Red Sea south of Suez. There did not appear to be inland areas of high promise. It was decided that in Phase II, several continuous wind recording instruments would be established on the North Coast and Red Sea Coasts. Locations finally selected for the North Coast (South Coast of the Mediterranean) were distributed from Mersa Matruh to Borg El Arab, a coastal community about seventy kilometers west of Alexandria. The recorded data from the monitoring stations are presented. (ERA citation 06:028536)

DE81026557 PC A03/MF A01
Solar Energy Research Inst., Golden, CO.
Application of Solar Ponds to District Heating and Cooling
C. M. Leboeuf. Apr 81, 41p Rept no. SERI/TR-731-1036
Contract AC02-77CH00178

Keywords: District cooling, *District heating, Heat distribution systems, *Solar ponds, *Solar water heating, Comparative evaluations, Cooling load, Cost, Design, Feasibility studies, Flat plate collectors, Heat exchangers, Heating load, Optimization, Pipes, Pumps, Salinity gradients, Size, Solar space heating, Texas, Washington dc.

A preliminary investigation is reported of the feasibility of incorporating solar ponds into new subdivisions to provide district heating, domestic hot water (DHW), and district cooling. Two locations were chosen for analysis: Fort Worth, Texas and Washington, DC. Solar ponds were sized to meet space heating, cooling, and DHW loads in each location for differing community sizes. Parameters such as storage layer temperature, pond geometry, and storage depth vs surface area were varied to determine the most effective approach to solar pond utilization. A distribution system for the district heating system was designed, including sizing of heat exchangers, piping, and pumps. Cost estimates for the pond and distribution system were formulated by using data generated in pond sizing, as well as associated system costs (e.g., salt costs and distribution system costs). Finally, solar ponds were found to be competitive with residential flat-plate collector systems, with delivered energy costs as low as $16.00/GJ. (ERA citation 06:027055)

DE81027122 PC A02/MF A01
Jacobs Energy Research Inc., Audubon, MN.
Hydraulic Wind Energy Conversion System
Jul 81, 18p Rept no. DOE/R5/10236-2
Contract FG02-80R510236

Keywords: Wind turbines, *Wind energy, Hydraulic equipment, Performance testing, Power generation, Test facilities.

The purpose of this research was to design, build and test a hydraulic wind energy system. This design used a three bladed turbine, which drove a hydraulic pump. The energy is transmitted from the pump through a long hose and into a hydraulic motor, where the energy is used. This wind system was built and tested during the winter of 1980-1981. The power train included a five meter, three bladed wind turbine, a 9.8:1 ratio gearbox, a 1.44 cubic inch displacement pump with a small supercharge gear pump attached. The hydraulic fluid was pumped through a 70', 3/4" I-D-high pressure flexhose, then through a volume control valve and into a 1.44 cubic inch displacement motor. The fluid was returned through a 70', 1" I-D-flexhose. (ERA citation 06:028561)

DE81027295 PC A05/MF A01
Solar Energy Research Inst., Golden, CO.
Anaerobic Fermentation of Beef Cattle Manure and Crop Residues. Annual Report, 1980
A. G. Hashimoto, Y. R. Chen, V. H. Varel, and S. A. Robinson. May 81, 91p Rept no. SERI/TR-98372-1-T1
Contract AC02-77CH00178

Keywords: *Manures, *Methane, Straw, *Agricultural wastes, Alkaline hydrolysis, *Bioconversion, Anaerobic digestion, Biosynthesis, Gas yields, Mixing, Ph value, Substrates, Temperature dependence.

This report summarizes research on the feasibility of fermenting manure-crop residue mixtures to methane, and on factors affecting the rate and extent of methane production. Experiments were conducted to evaluate effects of temperature, pH, substrate concentration, and alkaline pretreatment on the rate and extent of hydrolysis of manure-straw mixtures. The effects of mixing duration and vacuum fermenters on methane production rates from anaerobically fermented beef cattle wastes were also determined. (ERA citation 06:026968)

DE81029445 PC A07/MF A01
Chautauqua Inst. for Self-Reliance, Athens, OH.
Chautauqua Notebook: Appropriate Technology on Radio
B. Renz. 1981, 139p Rept no. DOE/IR/11128-T1
Contract FG03-80IR11128

Keywords: *Appropriate technology, *Energy conservation, Renewable energy sources, Information dissemination, Communications, Radio equipment.

Experiences in establishing and maintaining a regional call-in information-exchange radio show (Chautauqua) on energy conservation, appropriate technology, renewable energy sources, and self-reliance are discussed. Information is presented on: appropriate technology; the Chautauqua concept; topics discussed; research performed; guests; interviewing tips; types of listeners; program features; where to find help; promotion and publicity; the technical and engineering aspects; the budget and funding; and station policies.

DE82001338 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Small-Scale Energy-Technology Projects in the Pacific Territories: A Case-Study Review
C. W. Case, and M. K. Actouka. Sep 81, 47p Rept nos. LBL-12818, CONF-811053-1
Contract W-7405-ENG-48
Conference on ocean resource development in the Pacific, Honolulu, HI, USA, 13 Oct 1981.

Keywords: Appropriate technology, *Fishes, *Greenhouses, Guam, Oceania, Renewable energy sources, *Wood stoves, *Solar drying, *Solar water heating, Stoves, Design, Drying, Micronesia, Technology transfer, *Wood.

During 1978, 1979, and 1980, 28 small-scale energy projects were funded in the Pacific Territories. The projects attempt to be appropriate for developing Pacific island communities by using local labor and materials, using renewable resources, incorporating simple technologies, and being culturally sensitive. Most of the projects are completed now and are at the technology transfer stage. During the last three years the projects were monitored. Five case studies have been prepared which illustrate elements and define features which contribute or hinder technology transfer. Case studies include a typhoon-proof greenhouse on Guam, wood stoves and small solar devices on Yap, various devices built at a youth educational facility on Ponape, an unusual solar hot water system on Majuro, and a solar fish drying facility on an outer Truk island. Conclusions from these studies are extrapolated to all 28 projects. (ERA citation 07:006987)

DE82002175 PC A03/MF A01
Michigan Univ., Ann Arbor. Architectural Research Lab.
Solarization/Conservation Technology Development for Existing Housing. Progress Report
W. Oberdick. 1 Jun 81, 34p Rept no. DOE/R5/10227-2
Contract FG02-80R510227

Keywords: *Houses, *Solar heating systems, Appropriate technology, Energy audits, *Energy conservation, *Community development, Evaluation, Michigan, Retrofitting, Solar space heating.

The project objectives are: to develop a method for evaluating existing residences for their energy solarization/conservation potential as well as carrying out the solarization/conservation work within context of the Community Development program; and to demonstrate appropriate methods of utilizing solar energy in existing Ann Arbor residences beyond that obtainable in a good conservation program. A general progress update is presented covering tasks related to community solarization/conservation characteristics and community system analysis and development. The process of selection and technical evaluation of houses for solarization/conservation project directed retrofit is described. A detailed report on the survey of utility data and a report on the solarization/conservation site audits are included. A detailed comparison of the audit data for both the audit and control group are appended. (ERA citation 07:007023)

DE82003289 PC A02/MF A01
Solar Energy Research Inst., Golden, CO.
Plan for a Photovoltaic Applied Research Laboratory for Developing Countries
S. Hogan, K. Firor, T. Ciszek, J. Olson, and S. Wagner. Oct 81, 17p Rept no. SERI/TR-611-1094
Contract AC02-77CH00178

Keywords: Silicon solar cells, Budgets, Cost, Crystal growth, Developing countries, *Photovoltaic power system, Diffusion, Equipment, Fabrication, *Laboratories, Planning, Production, Purification, Research programs.

This paper is a guide for the planning of a photovoltaic laboratory in a developing country. With a budget of $500,000, equipment and materials are purchased for a four-year period. In the fourth year 1000W (peak power) of modules will be produced from blank silicon wafers. (ERA citation 07:003674)

DE82005238 PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Water Pumping in Developing Countries
P. G. Patil, and V. Mubayi. Aug 81, 35p Rept nos. BNL-30372, CONF-810865-9
Contract AC02-76CH00016
Solar world forum, Brighton, UK, 23 Aug 1981.

Keywords: Developing countries, *Irrigation, Pumps, Pumping, Energy demand, Renewable energy sources, Energy supplies, Economic analysis, Fossil fuels, Electric power, *Water pumps.

An analysis of the costs of mechanized irrigation in developing countries is presented. Both conventional (oil, electric) and renewable (solar, wind, biomass) energy sources have been considered as prime movers for small irrigation pumps. A range of renewable energy options, photovoltaic cell arrays powering electric pumpsets, windmill pumpers of the classic American type, and bio-gas powered engines, have been analyzed and the costs of irrigation pumping have been determined as functions of the appropriate variable (cell array prices, solar and wind availability, etc.) in each case. The study highlights the importance of more extensive data collection on renewable resource availability in DCs as well as the need for examining decentralized renewable resource technology in an integrated context of rural energy use.

DE82006152 PC A02/MF A01
Los Alamos National Lab., NM.
Promise and Status of International Applications of Photovoltaics
J. H. Altseimer, and M. C. Krupka. 1981, 25p Rept nos. LA-UR-81-3641, CONF-811212-7
Contract W-7405-ENG-36
International conference on alternative energy sources, Miami Beach, FL, USA, 14 Dec 1981.

Keywords: *Photovoltaic power system, Technology assessment, Commercialization, Marketing research, Developing countries, Ivory coast, Mexico, Forecasting, South Africa, Developed countries, United States, France, Federal republic of germany, Japan, Research programs.

A global overview of the status of the photovoltaics (PV) technology and its commercialization is presented. There are substantial marketing opportunities for selected PV applications, despite high-PV costs. These are mostly in the developing nations. Also, the adoption of solar technologies like PV might be quite beneficial to the developing nations. The Ivory Coast and Mexico were reviewed for their potential as PV consumers. The near-term potentials are promising. The long-term outlooks are clouded by possible competition from other indigenous energy resources or adverse political decisions. The Republic of South Africa, a highly industrialized nation, was also evaluated as a PV consumer. Its near-term potential appears to be minimal because of cheap coal power and an existing power grid. The same factors, plus nuclear power that will soon come on line, could inhibit long-term PV development. The US, France, West Germany, and Japan are the major industrial nations conducting research, development and commercialization programs on PV. At least twelve other countries are involved to a lesser degree. In technology, the US is ahead but the programs and the progress in the other three major countries are nevertheless significant. They are well aware of the exporting potential of PV and are taking steps to exploit it. France and West Germany are developing complete saleable systems, whereas the US has been concentrating on components. Japan has been developing its own technology base and systems and may soon decide to become more active in the market place. Federal funding in the US for PV is being drastically reduced. In contrast, the governmental funding in the other three major nations is relatively strong and appears to be growing.

DIB-76-02-503 PC E06/MF A01
P. A. Management Consultants (Pte) Ltd., Singapore.

Survey of the Market for Sawmilling and Woodworking Equipment in Singapore
Foreign market survey rept.
18 Jul 75, 112p
Sponsored in part by Domestic and International Business Administration, Washington, D.C.

Keywords: Market surveys, *Woodworking, *Sawmills, *Singapore, Molding machines, Planers, *Marketing, Drilling machines(Tools), Materials handling equipment, Exports, International trade, Market research, United States, SIC 3423, SIC 3537, SIC 3567, SIC 3811, SIC 3546, SIC 3425, SIC 3535, SIC 9770.

There are important markets in Singapore for several of the product categories under reference e.g., woodworking items. However, the total sawmilling and woodworking industry is not buoyant and in fact, certain sectors (e.g. sawmilling) are quite stagnant. Growth trends for the forseeable future would therefore not be significant. Currently, awareness of the U.S. range of products is poor. Most respondents had no prior experience with U.S. equipment. Several misconceptions were evident; for example, it was felt that: U.S. equipment is highly priced or even over-priced; U.S. equipment, because of its high level of sophistication, is often not relevant to local operating requirements. Sales potential for the immediate future is generally poor. Of the total range of items under review, respondents indicated that the items more likely to be purchased within the next two years would probably include portable sawmills, molders, planing machines, drilling machines, and materials handling equipment.

DIB-77-10-514 PC E06/MF A01
Chinca Credit Information Service Ltd., Taipei (Taiwan). Marketing Research Dept.
Plywood Processing and Woodworkig Equipment Study in Taiwan R. O. C
Foreign market survey rept.
Jun 77, 70p Rept no. Job-770355

Keywords: Market surveys, *Woodworking, *Plywood, *Taiwan, Exports, Market research, *Marketing, United States, SIC 3553, SIC 9770, Foreign trade.

The market research was undertaken to study the present and potential US share of the market in Taiwan for plywood processing and woodworking equipment; to examine growth trends in the Taiwan end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques were also reviewed.

DIB-79-10-500 PC$10.00/MF A01
Resources Development Associates, Los Altos, CA.
Small-Scale Fisheries Development in Djibouti
Foreign market survey rept.
Keith W. Cox, and Salvatore KiPalma. Dec 78, 105p
Contract AID/afr-C-1135-13
U.S. sales only for 8 months. Available to foreign addressees in May 80.

Keywords: *Fisheries, Economic development, Developing countries, Djibouti Republic, Production, Marketing, Food, Imports, Distribution(Property), Employment, Africa, Boats, Demand(Economics), Equipment, Technical assistance, Management, National government, Eastern Region(Africa).

In response to a request from the USAID Mission to Djibouti and AFR/DR/EAP, Washington, an RDA team consisting of a Senior Fisheries Specialist and a Senior Fisheries Economist visited Djibouti in October through November 1978 to evaluate the present fishery and, if appropriate, to recommend a program for fisheries development. This report summarizes the current status of fisheries in Djibouti, considers proposed development activities of other bilateral donors, and recommends a program of assistance to the small-scale artisinal fishermen of Obock, Tadjoura and Djibouti City. The project is designed to increase both fisheries production and improve marketing of the catch.

DOE/AD-0006/1 PC A09/MF A01
Department of Energy, Washington, DC.
DOE Facilities Solar Design Handbook
Jan 78, 177p
Contract W-7405-ENG-36

Keywords: *Buildings, Commercial buildings, *Solar cooling systems, *Solar heating systems, Manuals, Climates, Control systems, Data, Design, Economics, Heat storage, Heat transfer, Insolation, Regional analysis, Size, Solar air conditioners, Solar air conditioning, Solar collectors, Solar space heating, Solar-assisted heat pumps, Thermal insulation, Weather, Handbooks.

This handbook covers design of solar heating systems for commercial and laboratory buildings at Department of Energy Facilities. It includes discussions of solar energy fundamentals, solar heating and cooling technology, systems, and components, as well as a discussion of solar system economics. Quantitative analysis, with generalized design and sizing curves, is presented for solar heating so that collector and other system parameters can be cost-economically sized without a computer simulation. Solar system design considerations and guidelines, as well as guidelines for developing subsystem specifications, are presented. Thus this handbook is both a primer for the solar novice and a reference manual for the solar system designer. (ERA citation 03:030607)

DOE/BP/15325-T8 PC A02/MF A01
Oregon Inst. of Tech., Klamath Falls. Geo-Heat Utilization Center.
Ethanol: A Brief Economic Evaluation
Sep 80, 12p
Contract AC79-79BP15325

Keywords: Biomass conversion plants, *Ethanol, Biosynthesis, By-products, Economic analysis, *Corn, *Alcohols, *Fuels, *Bioconversion, Feasibility studies, Fermentation, Financial incentives, Geothermal process heat, Maize, *Sugar beets.

This construction of 10 million gallon per year ethanol plant is being considered. The initial feed to the plant would be corn, with sugar beets as a possible alternate feed. The ultimate plan is to use waste products and biomass feed stocks. Geothermal water would provide the necessary process heat for the plant. An economic evaluation was performed to assist the owners in their planning. Each of the following conclusions are based on an ethanol plant that produces 10 million gallons of ethanol per year. (1) Over a 20 year period, the plant using a corn feed stock would generate a rate of return of +12% on a total equity capital investment of $33,000,000. (2) Over a 15 year period, the plant using a corn feed stock is probably not economically feasible since it would have a rate of return less than 12% or a total equity capital investment of $33,000,000. (3) A corn feed stock plant operates at a loss for the first seven years if 95% of the $33,000,000 cost is debt financed. The plant is economically feasible only if offsetting energy income from other profitable operation permits taking advantage of investment tax credits and depletion allowances that are available. If this is true, the project is highly feasible, paying back twice the 5% equity capital in the first year. (4) A sugar beet ethanol plant is not economically feasible since the cost of operation exceeds the value of the products sold. This is based on sugar beets at $40 per ton, net back on the ethanol of $1.50 per gallon, and net back on the by-products of $4.94 per 100 pounds. (ERA citation 06:005890)

DOE/CE/04934-45 PC A03/MF A01
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Manual for Development of Small Scale Hydroelectric Projects by Public Entities
Mar 81, 40p
Contract AS02-78RA04934

Keywords: Low-head hydroelectric power plants, Urban areas, *Dams, Design, Economics, Feasibility studies, *Hydroelectric power, Legal aspects, Licensing, Manuals, Power potential, Retrofitting.

This manual is designed to provide guidance to towns, cities, counties and other political subdivisions which are interested in undertaking or participating in small scale hydroelectric (SSH) development within or close to their territorial boundaries. The manual is primarily directed to those political subdivisions which either own or have access to a site, are interested in exploring the prospects for development of the site and do not have longstanding experience in the electric power development. For purposes of this manual a small scale hydroelectric project is a project of 25 to 30 MWs or less and utilizes an existing dam or structure or utilizes the site characteristics of partially breached dams or structures. As the reader will observe from the discussion that follows, several incentives under federal and state law have been implemented which favor small scale hydroelectric development at existing sites. This manual is designed to assist political subdivisions in taking advantage of these incentives and devising strategies for development. The manual will provide information to political subdivisions as to what to expect in the development process and the kinds of informed questions to ask of paid advisers. The manual, however, cannot be and should not be used as a substitute for competent advice and assistance from experienced lawyers, engineers, accountants and financing experts. (ERA citation 06:019935)

DOE/CE/20167-05 PC A06/MF A01
National Center for Resource Recovery, Inc., Washington, DC.
Waste-to-Energy Compendium. Final Report
Apr 81, 125p
Contract AC01-76CS20167

Keywords: Cogeneration plants, Refuse derived fuels, Refuse-fueled power plants, *Fuels, *Waste disposal, *Energy conservation, Resource recovery facilities, Steam generation plants, Boilers, Capitalized cost, Combustion products, Cost, Data compilation, Energy recovery, Equipment, Maintenance, Market, Materials recovery, Operation, Refuse-fueled boilers, Solid wastes, Specifications, Steam generation, Surveys, Uses, Waste processing plants, Waterwall incinerators.

A survey is made of 35 waste-to-energy recovery projects throughout the US. Included are nine refuse-derived fuel (RDF) production facilities, six RDF user facilities, two combined RDF production-user facilities, and 16 mass burning facilities with energy recovery. Only those facilities that are fully operational or those in advanced stages of startup and shakedown are surveyed. Information is provided on processing capacities, operation and maintenance problems, equipment specifications, capital and operating costs, and the current status of each facility. In addition, process flow schematics are provided for each of the nine RDF production plants and both RDF production-user plants. Unless otherwise indicated, the data in this report have been updated to October or November, 1980. (ERA citation 06:022238)

DOE/CS-0015 PC A03/MF A01
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Used Oil Recycling Kit
Feb 78, 46p

Keywords: Lubricating oils, Waste oils, Recycling, Waste processing, *Oil, *Lubrication, Oil wastes, *Waste recycling, Materials recovery, Liquid waste disposal.

Basic facts, ideas, and sample tools necessary to start a communitywide used oil recycling program are provided. (ERA citation 03:039103)

DOE/CS-0038-2 PC A14/MF A01
Department of Energy, Washington, DC. Div. of Solar Applications Developments.
Solar Heating and Cooling Demonstration Project Summaries
Jan 79, 319p

Keywords: Solar air conditioning, *Solar heating systems, Solar space heating, Commercial buildings, Demonstration programs, Economics, Federal buildings, Maps, Performance, Residential buildings, Reviews, *Solar cooling systems, *Buildings.

The demonstration program includes commercial and residential-type buildings sponsored by DOE alone, or jointly with other Federal agencies, city and state governments, and private agencies. The commercial projects include a wide variety of building types, such as: office buildings, schools, fire stations, civic centers, factories, and libraries. Residential projects include both single and multifamily dwellings of various configurations. Approximately 200 projects will be instrumented to measure the performance of the solar systems. Analysis of the collected data will provide definitive guides for design criteria and permit realistic eco-

nomic assessment of various solar systems. The demonstrations are discussed in three sections: section I--Commercial Demonstration Program--Non-Federal Buildings; section II--Commercial Demonstration Program--Federal Buildings; and section III--Residential Demonstration Program--Federal Buildings. Maps showing the locations (by state) of the buildings are provided at the beginning of each section along with an index that identifies each project and page number for the corresponding descriptive information. A map depicting the distribution of all demonstration projects is included in this introduction. The comparable map from last year's publication is also shown to depict the increase in the number of projects. The contents of this document are based on information available as of November 1, 1978. (ERA citation 04:032966)

DOE/CS-0041/5 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Energy Audit Workbook for Die Casting Plants
Sep 78, 81p

Keywords: Energy accounting, *Energy conservation, *Industrial plants, Air conditioning, *Casting, Dies, Energy efficiency, Energy management, Lighting systems, Maintenance, Power factor, Space heating, Ventilation.

In a typical die-casting plant, it is possible to save as much as 15% of utility costs through common-sense actions without any appreciable capital expenditure. The workbook provides a do-it-yourself, fill-in-the-blanks approach to an energy-conservation program for die-casting plants that do not have full-time engineering personnel. Energy-conservation measures that demand no capital investment are: reduce the preheat time for molds and furnaces to the minimum required; preheat charge metal by storing on top of the furnaces; not over-fire; adjust the length of the mold preheater pilot flame to a minimum; lower the thermostats in the office area during the heating season; make the monthly energy consumption and cost data available to the manager and chief operating engineer; turn off stand-by furnaces that aren't absolutely necessary; lower the domestic hot water to 105 exp 0 F; and adjust burners to operate at the best efficiency. Measures that have shown a dramatic savings for the least initial investment are: design dies to minimize the amount of metal in the sprues and gates; cover hot stand-by crucibles with insulating covers; install electric ignitors at casting stations to eliminate the large gas pilot flames; put insulated covers on charging ports to cut down the radiation losses; if practical, use exhaust gas heat to preheat inlet air or to heat hot water; if you use a boiler for space heating, have a technician check the efficiency; use energy conserving fluorescent lamps; control exterior lighting with photo electric cells; preheat combustion air where practical; and if you are being penalized by the electric company for a low power factor, it may be cost-effective to correct it. (ERA citation 04:006053)

DOE/CS-0041/7 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Energy Audit Workbook for Restaurants
Sep 78, 79p

Keywords: Energy accounting, *Energy conservation, Restaurants, Air conditioning, Energy consumption, Energy efficiency, Energy management, Lighting systems, Space heating.

In a typical restaurant, it is possible to save as much as 15% of utility costs through common-sense actions without any appreciable capital expenditure. This workbook describes some simple methods by which the owner, manager, or operator of a restaurant can analyze energy uses, determine areas in which energy savings can be made, and estimate the magnitude of cost savings in accordance with U.S. Department of Energy procedures described as Class C Information Audits. The workbook provides a do-it-yourself, fill-in-the-blanks approach to an energy-conservation program for restaurants that do not have access to an engineering staff. Of necessity, it is a generalized approach that cannot be as detailed as an energy audit conducted by an engineering team. Start the energy audit of your restaurant by assembling energy-consumption data for the last 12 months, making yourself aware of your restaurant's geographic location and site conditions, and having your restaurant's description at hand. Next, list the heating plant, air-conditioning equipment, electrical equipment, and lighting fixtures that are controlled by you, the restaurant's owner or manager. These systems are the biggest energy users in a restaurant, and you will want to understand them to help identify means of making them more efficient with the aid of this workbook. (ERA citation 04:006055)

DOE/CS-0097 PC **A03**/MF **A01**
American Inst. of Industrial Engineers, Norcross, GA.
Saving Money with Energy Conservation: An Energy Audit Workbook for Restaurants
Jul 79, 37p
Contract EM-78-C-01-5226

Keywords: Restaurants, Cooling systems, Energy audits, *Energy conservation, Food, Heating systems, Lighting systems, Maintenance, Storage, Ventilation systems, Water heaters.

The workbook provides a do-it-yourself approach for restaurants which do not have full-time engineering personnel. Eleven easy ways of saving energy, e.g., lowering the thermostat, sealing leaks, using night set backs, turning off lights, etc., are presented. Additional ways to save energy and money in the following areas are recommended: food preparation and storage equipment, general building and heating, cooling, lighting, hot water, and ventilation systems. (ERA citation 05:016012)

DOE/CS-0132 PC **A20**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Architects and Engineers Guide to Energy Conservation in Existing Buildings
1 Feb 80, 469p

Keywords: *Buildings, *Energy conservation, Air filters, Cooling systems, Cost, Cost benefit analysis, Degree days, Efficiency, Energy consumption, Energy management, Heat losses, Heat recovery, Heating systems, Insolation, Lighting systems, Manuals, Modifications, Numerical data, Operation, Specifications, Tables, Waste heat utilization, Windows.

The manual enhances and simplifies the work of those architects and engineers whose practice includes the analysis and modification of existing buildings to reduce both fuel consumption and operating costs. A review of the principles of energy use and conservation is given. The manual also provides a step-by-step methodology for assessing and improving the year-round energy performance of buildings, as well as a series of forms, charts, and nomographs designed to serve as day-to-day tools in the energy professional's toolbox. After a cost-benefit analysis is prepared for each conservation opportunity, the owner will be able to implement decisions based on projected energy savings and calculate investment costs, operational changes, and payback periods. Each of these considerations is accorded a detailed treatment. (ERA citation 05:015987)

DOE/CS/20167-04 PC **A07**/MF **A01**
National Center for Resource Recovery, Inc., Washington, DC.
Use of RDF as a Kiln Fuel. Final Report
Oct 80, 136p
Contract AC01-76CS20167

Keywords: Cement industry, Kilns, Portland cement, Refuse derived fuels, *Cement, *Fuels, *Industrial wastes, *Industrial plants, Calcination, Chemical properties, Combustion properties, Commercialization, Data compilation, Energy recovery, Limestone, Municipal wastes, Physical properties, Production, Research programs, Shales.

Refuse derived fuel (RDF) has been experimented with and/or proposed for use in kilns for the production of portland cement, lime, and expanded shale (a form of lightweight aggregate). Technological issues affecting the use of RDF in kilns are reviewed as are the results of trials in which RDF has been used as a kiln fuel. Three future research/demonstration projects for addressing the major unresolved issues are discussed. These projects are: a lime plant trial; a trial in a precalcining furnace; and an extended trial in a cement kiln. (ERA citation 06:007907)

DOE/CS/30062-1 PC **A25**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Solar Heating and Cooling of Residential Buildings: Sizing, Installation and Operation of Systems. 1980 Edition
Sep 80, 584p
Contract AC02-79CS30062

Keywords: *Buildings, Residential buildings, *Solar cooling systems, *Solar heating systems, Curriculum guides, Design, Education, Educational tools, Installation, Maintenance, Manuals, Operation, Solar space heating, *Solar water heating.

This manual was prepared as a text for a training course on solar heating and cooling of residential buildings. The course and text are directed toward sizing, installation, operation, and maintenance of solar systems for space heating and hot water supply, and solar cooling is treated only briefly. (ERA citation 06:016693)

DOE/CS/4431-T1 PC **E02**/MF **A01**
Radian Corp., Austin, TX.
Energy Conservation: A Route to Improved Distillation Profitability. Executive Briefing Report, Technology Transfer
1980, 29p
Contract W-31-109-ENG-38

Keywords: Chemical industry, Distillation equipment, *Distilleries, *Industrial plants, Petroleum industry, Capitalized cost, *Energy conservation, Investment, Operating cost, Profits.

The savings potential of energy-conservation measures applied to distillation is examined. The document catalogs all of the various energy-conservation options applicable to distillation; categorizes the options by investment required; and describes in detail the options having a significant potential to reduce distillation energy requirements economically. A technology applications manual designed to assist distillation process engineers who will perform technical and economic analyses to determine the conservation measures most suitable for their particular plant is also available (DOE/CS/4431-T2). (ERA citation 05:032485)

DOE/CS/60038-T1 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Cooperative Extension Service.
Energy Conservation in Swine Buildings
D. D. Jones, and W. H. Friday. May 80, 7p
Contract FG-45-76CS60038

Keywords: Animal shelters, Swine, Animal breeding, Energy consumption, *Energy management, *Animal husbandry, Heat losses, Modifications, R factors, Space hvac systems, Temperature control, Thermal insulation.

Saving energy in confinement swine buildings can be achieved by conserving existing animal heat through both proper building construction and control of the environment. Environmental management practices considered include building insulation and modifications, heating and cooling system selection, ventilation system adjustments, and proper building temperature. (ERA citation 06:007876)

DOE/CS/80010-T2 PC **A04**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Agricultural Development.
Farm Fuel Alcohol Project: Preliminary Report on Facility Design
R. S. Pile, P. C. Badger, J. C. Roetheli, and E. L. Waddell, Jr. Sep 79, 56p
Contract AI01-80CS80010

Keywords: Biomass conversion plants, *Ethanol, Maize, *Bioconversion, *Alcohols, *Corn, *Fuels, Batch culture, Biosynthesis, Design, Distillation equipment, Energy recovery, Equipment, Farms, Fermentation, Waste heat utilization.

This report describes the design of a farm-based ethanol production system to be built by TVA at Muscle Shoals, Alabama. This facility will include cooking, fermentation, and distillation equipment to allow production of 8000 to 12,000 gallons of fuel ethanol during a three to four month period each year. Output will be about 10 gallons of 190-proof ethanol per hour. Present components are sized to allow 12 to 14 hour daily operation as a semi-continuous batch system. Intent of

the project is to document equipment and energy requirements, ethanol yields, and feasibility of small farm-based ethanol plants for farm fuel self-sufficiency. Cooking and fermentation will be batch-type operations, and packed distillation columns will be used for separating ethanol from the fermented beer. Energy recovery and waste heat use are integrated when feasible. The fermented beer will be fed directly to the distillation columns without separation of solids. Although this is an area of concern, an economical method of separation could not be identified. (ERA citation 06:008713)

DOE/CS/83010-1 PC A03/MF A01
Scottsbluff-Gering Payroll Development Foundation, Inc., Scottsbluff, NE.
Study of the Production of Ethanol from Sugar Beets for Use as a Motor Fuel. Final Report, February 1, 1980-April 30, 1981
H. W. Baird. 27 Apr 81, 41p
Contract AC02-80CS83010

Keywords: Biomass conversion plants, *Ethanol, *Sugar beets, Economic analysis, *Automotive fuels, *Industrial plants, *Bioconversion, *Fuels, *Alcohols, Environmental impacts, Feasibility studies, Fermentation, Health hazards, Investment, Market, Operating cost, Production, Safety, Site selection, Socio-economic factors.

This study was performed to assess the feasibility of producing fuel ethanol from sugar beets. Sugar beets are a major agricultural crop in the area and the beet sugar industry is a major employer. There have been some indications that increasing competition from imported sugar and fructose sugar produced from corn may lead to lower average sugar prices than have prevailed in the past. Fuel ethanol might provide an attractive alternative market for beets and ethanol production would continue to provide an industrial base for labor. Ethanol production from beets would utilize much of the same field and plant equipment as is now used for sugar. It is logical to examine the modification of an existing sugar plant from producing sugar to ethanol. The decision was made to use Great Western Sugar Company's plant at Mitchell as the example plant. This plant was selected primarily on the basis of its independence from other plants and the availability of relatively nearby beet acreage. The potential feedstocks assessed included sugar beets, corn, hybrid beets, and potatoes. Markets were assessed for ethanol and fermentation by-products saleability. Investment and operating costs were determined for each prospective plant. Plants were evaluated using a discounted cash flow technique to obtain data on full production costs. Environmental, health, safety, and socio-economic aspects of potential facilities were examined. Three consulting engineering firms and 3 engineering-construction firms are considered capable of providing the desired turn-key engineering design and construction services. It was concluded that the project is technically feasible. (ERA citation 06:019958)

DOE/EIA-0183/10 PC A02/MF A01
Department of Energy, Washington, DC.
Energy Demand in the Developing Countries
J. Child, and M. Rodekohr. Apr 79, 20p

Keywords: Coal, Developing countries, Energy demand, Natural gas, Petroleum, Comparative evaluations, Consumption rates, Energy consumption, Forecasting, Opec, Tables, *Energy source development.

This paper presents a summary of an analysis of the demand for energy in OPEC and the non-OPEC Developing Countries. While current energy-consumption levels in these countries are relatively small, their future economic growth is expected to be above the world average; therefore, their share of world energy demand is expected to increase. Their relatively high growth rates imply that the energy demanded by these nations will become increasingly important in any future evaluation of Free World energy markets. This paper presents a new model of developing country energy demand which is econometric in nature and is designed to forecast demand for oil, coal, and natural gas - excluding non-fossil fuels. Differences between the model used for the 1977 EIA Annual Report to Congress (1977 ARC) and the new model to be used in the 1978 ARC are discussed, the new model and data used in the analysis are defined, and results generated with the 1978 model and the 1977 model based on identical sets of assumptions are compared. (ERA citation 04:055086)

DOE/ET-0036/1 PC A04/MF A01
Department of Energy, Washington, DC. Div. of Solar Technology.
Guide to Solar Energy Programs
Jun 78, 75p

Keywords: Research programs, Bioconversion, Demonstration programs, Energy source development, Environmental impacts, Ocean thermal energy conversion, Organizational models, Photovoltaic power plants, Solar energy, Solar thermal power plants, Wind power plants, *Solar energy, Research projects.

The following are included: Department of Energy mission and objectives, overview of the Department of Energy's solar energy programs, program activities and structure, solar energy programs now functioning under the Division of Conservation and Solar Applications, methods of procurement and guides for proposal preparation, and sources of solar energy information and activities supporting the solar energy program. Included in appendices are: Energy Research Abstracts collections, documents available from National Solar Heating and Cooling Information Center, documents available from DOE Technical Information Center and U.S. Government Printing Office, a ready guide to solar information sources, and a glossary of solar energy terms. The program structure is divided into Solar Thermal Power Systems Program, Photovoltaic Systems Program, Fuels from Biomass Program, Ocean Thermal Systems Program, Wind Energy Systems Program, the Environmental and Resource Assessment Program, Satellite Power System Program, and major projects. (ERA citation 04:021952)

DOE/ET/20051-T1 PC A99/MF A01
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Anaerobic Fermentation of Agricultural Residue: Potential for Improvement and Implementation. Final Report, Volume II
W. J. Jewell, S. Dell'orto, K. J. Fanfoni, T. D. Hayes, and A. P. Leuschner. Apr 80, 934p
Contract AS02-76ET20051

Keywords: Biomass conversion plants, *Manures, *Methane, Anaerobic digestion, Biogas process, Biosynthesis, Chemical reactors, Cows, Design, Farms, Maintenance, Operation, *Bioconversion, *Agricultural wastes.

Earlier studies have shown that although large quantities of agricultural residues are generated on small farms, it was difficult to economically justify use of conventional anaerobic digestion technology, such as used for sewage sludge digestion. A simple, unmixed, earthen-supported structure appeared to be capable of producing significant quantities of biogas at a cost that would make it competitive with many existing fuels. The goal of this study was to define and demonstrate a methane fermentation technology that could be practical and economically feasible on small farms. This study provides the first long term, large scale (reactor volumes of 34 m exp 3) parallel testing of the major theory, design, construction, and operation of a low cost approach to animal manure fermentation as compared to the more costly and complex designs. The main objectives were to define the lower limits for successful fermentor operation in terms of mixing, insulation, temperature, feed rate, and management requirements in a cold climate with both pilot scale and full scale fermentors. Over a period of four years, innovative fermentation processes for animal manures were developed from theoretical concept to successful full scale demonstration. Reactors were sized for 50 to 65 dairy animals, or for the one-family dairy size. The results show that a small farm biogas generation system that should be widely applicable and economically feasible was operated successfully for nearly two years. Although this low cost system out-performed the completely mixed unit throughout the study, perhaps the greatest advantage of this approach is its ease of modification, operation, and maintenance. (ERA citation 05:037793)

DOE/ET/20071-T2 PC A04/MF A01
Center for Energy and Environment Research, Rio Piedras, PR.
Production of Sugarcane and Tropical Grasses as Renewable Energy Source. Third Annual Report, 1979-1980
1980, 74p
Contract AS05-78ET20071

Keywords: *Grass, Sorghum, *Sugarcane, Biomass, Cloning, Cost, Cultivation techniques, Economic analysis, Energy balance, Harvesting, Nutrients, Plant breeding, Production, Renewable energy sources, Short rotation cultivation, Yields, *Fuels.

Research continued on tropical grasses from Saccharum and related genera as sources of intensively-propagated fiber and fermentable solids. Candidate screening for short-rotation grasses was expanded to include six sorghum x Sudan grass hybrids developed by the Dekalb Company. Sugacane and napier grass yield trends in year 3 include: (1) Increased yields with delay of harvest frequency; (2) lack of response to close spacing; (3) a superiority of napier grass over sugarcane when harvested at intervals of six months or less; and (4) a general superiority of the sugarcane variety NCo 310 over varieties PR 980 and PR 64-1791. Delayed tasseling of a wild, early-flowering S. spontaneum hybrid enabled three crosses to be made in December using commercial hybrids as female parents. Approximately 1000 seedlings were produced. The first field-scale minimum tillage experiment was completed. Sordan 77 produced 2.23 OD tons/acre/10 weeks, with winter growing conditions and a total moisture input of 4.75 inches. Mechanization trials included successful planting of napier grass with a sugarcane planter, and the mowing, solar-drying, and round--baling of napier grass aged three to six months. Production-cost and energy-balance studies were initiated during year 3 using first-ratoon data for intensively propagated sugarcane. Preliminary cost estimates for energy cane (sugarcane managed for total biomass rather than sucrose) were in the order of $25.46/OD ton, or about $1.70/mm Btus. (ERA citation 06:002167)

DOE/EV-0108 PC A04/MF A01
Argonne National Lab., IL.
Alcohol Production from Agricultural and Forestry Residues
L. Dale, R. Opilla, and T. Surles. Sep 60, 56p
Contract W-31-109-ENG-38

Keywords: *Agricultural wastes, *Ethanol, Maize, *Methanol, *Wood wastes, *Alcohols, Acid hydrolysis, Air pollution, Distillation, Enzymatic hydrolysis, Fermentation, Gasification, Land use, Plant stems, Production, Straw, Water pollution, Wheat.

Technologies available for the production of ethanol from whole corn are reviewed. Particular emphasis is placed on the environmental aspects of the process, including land utilization and possible air and water pollutants. Suggestions are made for technological changes intended to improve the economics of the process as well as to reduce some of the pollution from by-product disposal. Ethanol may be derived from renewable cellulosic substances by either enzymatic or acid hydrolysis of cellulose to sugar, followed by conventional fermentation and distillation. The use of two agricultural residues - corn stover (field stalks remaining after harvest) and straw from wheat crops - is reviewed as a cellulosic feedstock. Two processes have been evaluated with regard to environmental impact - a two-stage acid process developed by G.T. Tsao of Purdue University and an enzymatic process based on the laboratory findings of C.R. Wilke of the University of California, Berkeley. The environmental residuals expected from the manufacture of methyl and ethyl alcohols from woody biomass are covered. The methanol is produced in a gasification process, whereas ethanol is produced by hydrolysis and fermentation processes similar to those used to derive ethanol from cellulosic materials. (ERA citation 05:037844)

DOE/IR-0040 PC A05/MF A01
Department of Energy, Washington, DC. Office of Consumer Affairs.
Conservation and Renewable Energy Resource Directory
Jan 79, 86p

Keywords: *Energy conservation, Renewable energy sources, Directories, Agriculture, Appropriate technology, Biomass, Buildings, Co-generation, Commercial-

ization, Communities, Education, Energy consumption, Energy storage, Engines, Environment, Human populations, Hydroelectric power plants, Industry, Information, Information centers, Ocean thermal energy conversion, Research programs, Solar energy, Solar energy research institute, Total energy systems, Transportation systems, Us doe, Wind power, Listings.

The Directory facilitates quick access to DOE offices responsible for conservation and renewable energy activities. Because several offices in DOE may have responsibility for various phases of a technology or service (i.e., research, development, demonstration, commercialization, information, education, etc.) the Directory lists the key contacts from the various phases by category. The Directory is organized in five main categories plus an index and relevant appendices. The categories are: revewable energy technologies (thermal and olectric solar, wind energy systems, small scale hydroelectric, biomass, ocean systems); complementary technologies (appropriate technology, advanced engine design, cogeneration, energy storage, total energy systems); conservation technologies (buildings and community systems, transportation, industrial and agricultural energy conservation, state and local programs); environment; and support services (information, outreach, education, small business support, basic research, data and analysis, publication, films, Solar Energy Resoarch Institute, regional offices laboratories, and information centers). (ERA citation 04:033711)

DOE/IR/10999-1 PC **A04**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Bicycle Promotion Plan
G. A. Simone. 9 Mar 81, 65p
Contract AC01-80IR10999

Keywords: *Bicycles, Design, Energy conservation, Financial incentives, Government policies, Grants, Implementation, National program plans, Planning, Program management, Public opinion, Recommendations, US DOE, Uses.

The objective of this Bicycle Promotion Plan is to outline a set of recommendations and supporting strategies for implementation by the US DOE toward increased use of the bicycle for energy conservation. The recommendations are designed in such a way as to function in concert with: (1) bicycle programs administered by other Federal government agencies; and (2) related programs and activities already sponsored by DOE. The approach to preparation of the Plan involved a review of all current and planned bicycle promotion programs at the Federal level as well as a review of the array of lierature on the subject. The UniWorld project staff also interacted with several DOE program offices, in order to determine the extent to which they might appropriately contribute to the implementation of bicycle promotional efforts. A synthesis of all the information gathered was published in January of 1981 as a part of the project (The Bicycle Program Review). Based upon this information and an examination of the barriers to bicycle use identified by bicycle transportation specialists in the field, UniWorld developed a series of the most potentially effective recommendations and program strategies for implementation by DOE. The recommendations address activities that could be undertaken in conjunction with existing DOE programs, new developments that might be considered to fulfill critical needs in the field, and interagency efforts that DOE could play a role in. (ERA citation 06:016981)

DOE/NASA/1022-78/29 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Photovoltaic Water Pumping Applications: Assessment of the Near-Term Market
L. Posenblum, W. J. Bifano, L. R. Scudder, W. A. Poley, and J. P. Cusick. Mar 78, 25p Rept no. NASA-TM-78847
Contract EX-76-A-29-1022

Keywords: *Photovoltaic power system, *Solar water pumps, Solar cell arrays, Commercialization, Developing countries, Evaluation, Market, *Irrigation, *Water pumps, Marketing.

A preliminary assessment of the near-term market for photovoltaic water pumping applications is presented. One of the objectives of the Department of Energy's (DOE) National Photovoltaic Program is to stimulate the demand for photovoltaic power systems so that appropriate markets will be developed in the near-term to support the increasing photovoltaic production capacity also being developed by DOE. Water pumping applications represent such a potential market for photovoltaics. The price of energy for photovoltaic systems is compared to that of utility line extensions and diesel generators. The potential "domestic" demand is defined in the government, commercial/institutional and public sectors. The fore'gn demand and sources of funding for water pumping systems in the developing countries are also discussed briefly. It is concluded that a near-term domestic market of at least 240 megawatts (peak) and a foreign market of about 6 gigawatts (peak) exists and that significant market penetrations should be possible beginning in the 1981-82 period. (ERA citation 03:032896)

DOE/NASA/1022-78/39 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Design and Fabrication of a Photovoltaic Power System for the Papago Indian Village of Schuchuli (Gunsight), Arizona
W. J. Bifano, A. F. Ratajczak, and W. J. Ice. 1978, 10p Rept nos. CONF-780619-12, NASA-TM-78948
Contract EY-76-A-29-1022
IEEE photovoltaic specialists conference, Washington, DC, USA, 5 Jun 1978.

Keywords: Communities, *Solar water pumps, *Photovoltaic power system, Appliancos, Arizona, Clothes washers, Design, Direct current, Electric batteries, Lighting systems, Overhead power transmission, Power range 1-10 kw, Pumps, Refrigerators, Remote areas, Size, Solar cell arrays, *Electric power, *Irrigation, *Water pumps, Solar cells, Solar energy conversion, Photovoltaic conversion, Schuchuli(Arizona).

In its role of supporting the DOE National Photovoltaic Program, the NASA-LeRC is designing and fabricating a stand-alone photovoltaic power system for installation in the Papago Indian village of Schuchuli, located approximately 120 miles west of Tucson, AZ. This village presently has no electrical power. The photovoltaic system is being designed to provide electricity for village water pumping and basic domestic needs as part of a cost-shared experiment involving LeRC, the U.S. Public Health Service and the Papago Tribe of Arizona. The system will consist of a 3.5 kW (peak) photovoltaic array; controls, instrumentation, and storage batteries located in an electrical equipment building; and a 120 volt DC village distribution network. The photovoltaic system will power a 2 HP DC electric motor (replacing an existing diesel engine) for water pumping; 15 refrigeration units, a washing machine and a sewing machine in a domestic services building; and fluorescent lights in the feast house, church and each of the 15 homes in the village. (ERA citation 03:052253)

DOE/NASA/20485-79/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Social and Economic Impact of Solar Electricity at Schuchuli Village: A Status Report
W. J. Bifano, A. F. Ratajczak, D. M. Bahr, and B. G. Garrett. 1979, 18p Rept no. NASA-TM-79194

Keywords: *Photovoltaic power system, Residential buildings, American Indians, Arizona, Clothes washers, Evaluation, Lighting systems, Refrigerators, Remote areas, Socio-economic factors, *Community development, Papago Indian Reservation, Schuchuli(Arizona).

Schuchuli, a small remote village on the Papago Indian Reservation in southwest Arizona, is 27 kilometers (17 miles) from the nearest available utility power. In some respects, Schuchuli resembles many of the rural villages in other parts of the world. For example, it's relatively small in size (less than 100 residents), composed of a number of extended family groupings, and remotely situated relative to major population centers (190 km, or 120 miles, from Tucson). Its lack of conventional power is due to the prohibitive cost of supplying a small electrical load with a long-distance distribution line. Furthermore, alternate energy sources are expensive and place a burden on the resources of the villagers. On December 16, 1978, as part of a federally funded project, a solar cell power system was put into operation at Schuchuli. The system powers the village water pump, lighting for homes and other village buildings, family refrigerators and a communal washing machine and sewing machine. The project, managed for the US Department of Energy by the NASA Lewis Research Center, provides for two years of technical monitoring as well as a one-year socio-economic study to assess the impact of a relatively small amount of electricity on the basic living environment of the villagers. The project background, implementation details and current status of the technical and socio-economic assessment are presented. (ERA citation 04:049641)

DOE/RA-0048 PC **A16**/MF **A01**
Hydrologic Engineering Center, Davis, CA.
Feasibility Studies for Small Scale Hydropower Additions. A Guide Manual
Jul 79, 356p
Contract AI01-77RA11025

Keywords: Low-head hydroelectric power plants, Capacity, Comparative evaluations, Data compilation, Economic analysis, Feasibility studies, Hydraulic turbines, *Hydroelectric power, Hydrology, Manuals, Performance, Power generation, Safety, Specifications, *Technology assessment, Water requirements, Water reservoirs.

A manual is presented that provides tochnical data and procedural guidance for the systematic appraisal of the viability of potential small hydropower additions. It focuses upon the concepts, technology, and economic and financial issues unique to small hydropower additions. The manual is comprised of six volumes: Technical Guide, Volume 1, overviews the investigation process, provides implementation guidance, and documents case study applications; Economic and Financial Analysis, Volume II, includes criteria and procedures for marketing and valuing power output, determining economic feasibility, and analyzing financial requirements and issues critical to implementation; Hydrologic Studies, Volume III, describes investigations necessary to evaluate the hydrologic integrity of the existing facility and to estimate the power potential of the hydropower addition; Existing Facility Integrity, Volume IV, provides guidance for assessing the ability of a site to safely accommodate a power addition; Electromechanical Features, Volume V, describes selection criteria and performance characteristics of small hydro generation and ancillary equipment; and Civil Features, Volume VI, provides preliminary design and cost guidelines for the civil features of power additions. A glossary of hydropower terms follows Volume VI. (ERA citation 05:031738)

DOE/R5/10124-T1 PC **A02**/MF **A01**
Klaus (Thomas), Cooks, MI.
Windmill for Irrigation Pond. Final Report
T. J. Klaus. 9 Sep 80, 9p
Contract FG02-79R510124

Keywords: Wind-powered pumps, Agriculture, Crops, Farms, *Irrigation, *Wind energy, *Water pumps, Performance, Specifications, Strawberries.

The application of a wind-powered pump for irrigating a strawberry farm is described. (ERA citation 06:016774)

DOE/SF/01916-T1 PC **A02**/MF **A01**
Hydrocoil, Inc., City of Commerce, CA.
Waste-Heat Recovery System for Commercial Cooking Appliances. Final Report
R. J. Jones. Dec 80, 21p
Contract FG03-78SF01916

Keywords: Heat recovery equipment, Restaurants, Appropriate technology, *Waste heat utilization, Demonstration programs, *Energy conservation, Field tests, Food industry, Gas appliances, Load analysis, Natural gas, Performance, Stoves.

Installation of the Hydrocoil Waste Heat Recovery System over a battery of gas-fired commercial cooking appliances in a restaurant in Pasadena, California, is discussed. Installation of the equipment resulted in gas usage reduction, a savings to the restaurant owner of $70/month at a gas cost of $0.26/ccf. The term load factor or the ratio of actual usage compared to the maximum potential burner consumption of gas for commercial cooking equipment is defined. (ERA citation 06:018900)

DOE/SF/01963-T1 PC **A03**/MF **A01**
Department of Energy, San Francisco, CA. Region IX.

Summary of Projects: Small-Scale Appropriate-Energy Technology Grants Program
1980, 32p
Contract FG03-78SF01963

Keywords: Appropriate technology, Western region, Biomass, Buildings, Design, *Bioconversion, Educational tools, Food processing, *Greenhouses, Heat storage, *Hydroelectric power, Research programs, *Solar cooling systems, *Solar heating systems, Solar water heaters, *Wind energy.

Summaries are briefly reported of over 180 projects in Region IX in the Appropriate Energy Technology Program. Broadly, the projects are categorized as follows: housing and building design; greenhouse systems; solar in industrial and agricultural applications; solar water heating; solar cooling and heating; heat storage; food preparation; wind; biomass (alcohol fuels, methane gas, combustion); hydroelectric power; integrated systems; and education and workshops. (ERA citation 06:016903)

DOE/SF/01963-T3 PC A02/MF A01
Freebairn-Smith (Rod), Muir Beach, CA.
Summary of Projects, Small Scale Appropriate Energy Technology. Region IX Program, 1979
1979, 24p
Contract FG03-78SF01963

Keywords: Appropriate technology, Air conditioners, Aquaculture, Biomass, Control systems, Design, Food, *Geothermal energy, *Greenhouses, Heat recovery, Heat storage, Houses, *Hydroelectric power, Research programs, *Solar cooling systems, Solar space heating, *Solar water heating, Space heating, Storage, Western region, *Wind energy.

Summaries of the appropriate energy technology projects in Region IX are presented. The projects (over 100) are categorized into the following: house and building design; greenhouse systems; integrated systems; aquaculture; performance controls; hydroelectric; geothermal; food storage; biomass; wind and pumps; heat recovery and storage; solar space heating and cooling; cooling; and solar hot water. (ERA citation 06:016885)

DOE/TIC-10009 PC A03/MF A01
Market Facts, Inc., Washington, DC.
Electric/Hybrid Vehicles Focus Group Research
Aug 78, 39p
Contract EV-78-C-01-6458

Keywords: Electric-powered vehicles, Hybrid electric-powered vehicles, Appropriate technology, Commercialization, Decision making, Energy analysis, *Energy conservation, Evaluation, Market, Regulations, US DOE, *Automobiles, Meetings.

This report presents the major conclusions and findings from the focus group discussion on electric/hybrid vehicles, providing input in two decision-making areas: (1) evaluation of barriers and opportunities associated with successful commercialization of electric/hybrid vehicles; and (2) evaluation of appropriate Federal actions for promoting and facilitating commercialization. The technology represented by electric/hybrid vehicles was selected for research and evaluation as a candidate for commercialization because of the potential opportunity to reduce American dependence on gasoline. DOE recognizes that this potential can be realized through energy conservation as well as through the development of alternative sources of energy. As a major source of energy usage in the United States, the gasoline-powered vehicle is a logical target for consideration in commercialization studies. By encouraging the use of alternative technologies, DOE can achieve its mission of energy efficiency. This report addresses the question of whether electric/hybrid vehicles represent the appropriate alternative technology for DOE commercialization efforts. (ERA citation 04:034131)

DOE/TIC-10017 PC A03/MF A01
Market Facts, Inc., Washington, DC.
Low Head Hydropower: Focus Group Results
Aug 78, 32p
Contract EV-78-C-01-6458

Keywords: *Hydroelectric power, *Electric power, Low-head hydroelectric power plants, Appropriate technology, Commercialization, Cost, Dams, Decision making, Economics, Energy efficiency, Evaluation, Feasibility studies, Financing, Government policies, Licensing, Market, Retrofitting, Standardization, Electric power plants, National government, Constraints, Marketing, Meetings.

This report presents the major conclusions and findings obtained from a focus group discussion concerning low-head hydroelectric power generation. The information will provide DOE information from which to evaluate the barriers and opportunities associated with the successful commercialization of low head hydropower and to evaluate the appropriate Federal actions for promoting and facilitating commercialization of this technology. The primary questions put before the discussion group participants were: is commercialization of low head hydropower feasible; what is the nature and extent of the market for this technology; what barriers and opportunities are critical to the commercialization of low head hydropower; and what actions, if any, should be taken by the Federal government to bring about successful commercialization of this technology. The opinions, attitudes, and knowledge of the participants on these issues are summarized. (ERA citation 04:032775)

DOE/TIC-10143 PC A11/MF A01
Total Environmental Action, Inc., Harrisville, NH.
Design of Residential Buildings Utilizing Natural Thermal Storage. Final Report
D. Lewis, C. Michal, and P. Pietz. Jun 79, 238p
Contract EY-76-C-02-0016

Keywords: Building materials, Houses, *Energy conservation, Cooling load, Design, Economics, Efficiency, Furnaces, Graphs, Heat storage, Heat transfer, Heating load, Numerical data, Thermal energy storage equipment, USA, *Buildings, Residential buildings, Structural design.

The thermal storage capacity found in the materials of conventional building construction affect the heating and cooling requirements of buildings and the long-term efficiency of the space conditioning equipment used to meet these demands. The quantity of this natural thermal storage (NTS) can be increased through architectural design to improve overall building thermal performance and decrease the consumption of conventional fuels used for space conditioning. Improvements in performance come about when heating or cooling peak loads are reduced, when previously poorly used natural energy sources are tapped, or when conventional system efficiencies are increased. The capability of NTS materials to absorb, store and release thermal energies can be used advantageously to bring about these improvements. The technical and economic feasibility of these uses of NTS in residental construction in the north central and northeast US is examined. For many NTS applications, the percentage savings in heating and cooling are impressive, but the actual value of the energy saved is found to be insufficient to justify the incremental cost of NTS over reasonable levels of insulation and other energy strategies. NTS in the form of modified Trombe walls, when combined with energy conserving construction methods, is found to be an effective, available and marketable system. A prototypical residence incorporating this NTS system is designed for instrumentation and as a demonstration of NTS principles. Annual space conditioning costs are reduced to one-third of those found in new construction built to current codes, and less than one-fifth the costs found in typical existing homes. (ERA citation 04:048828)

DOE/TIC-1021874 PC A11/MF A01
Wisconsin Univ.-Extension, Madison.
Municipal Energy Conservation Manual
Jun 79, 238p

Keywords: Communities, Energy audits, Local government, Calculation methods, *Energy conservation, *Energy management, Heat losses, Lighting systems, Manuals, Public buildings, Roads, Temperature monitoring, Waste water, Water treatment plants, Wisconsin.

A procedure for conducting an energy audit of an entire municipal government, including both its buildings and its various operations, is presented in the manual. The following topics are presented: energy conservation management; municipal buildings; standardize and regulate temperature; street lighting; motor vehicle energy conservation; waste water treatment plant of Marinette; equipment required for building energy audit; performing an energy audit; calculating heat losses; and audit notes and calculations. A table is included that illustrates that the highest energy use may have a much lower total cost than anticipated. Charts based on the cost and amount of energy used by Stevens Point and Marinette are given. Forms for use in the auditing process are provided in the appendices. (ERA citation 06:022252)

DOE/TIC-1022897 PC A03/MF A01
Dane County Regional Planning Commission, Madison, WI.
Energy Conservation Manual: A Guide for Regional Planning Commission Assistance to Small Municipalities
1980, 47p

Keywords: Communities, *Energy conservation, *Regional planning, Evaluation, Local government, Management, Manuals, Planning, Wisconsin.

A management guide is presented for Regional Planning Commissions to provide assistance and coordination in addressing energy conservation issues. The process and experiences of the Dane County Regional Planning Commission in assisting member governments in their search for answers to energy conservation problems are described. The process is described in detail and the kinds of problems and difficulties which can occur along the way are noted. (ERA citation 06:022253)

DOE/TIC-11247 PC A02/MF A01
Battelle Columbus Labs., OH.
Fuels from Biomass Systems for Arid Land Environments
E. S. Lipinsky, and S. Kresovich. 1979, 13p
Contract W-7405-ENG-92-102
From Proceedings of the international arid lands conference on plant resources, Texas Tech University.

Keywords: *Arid land, Biomass plantations, Biomass, Ecosystems, Energy balance, Feasibility studies, *Fuels, *Wood, Plant breeding, Systems analysis.

Integrated fuels from biomass systems that might function in arid environments are discussed and illustrated. The emphasis is on principles and strategic guidelines for use by those initiating studies on arid land fuels from biomass. (ERA citation 05:033424)

DOE/TIC-11261 PC A02/MF A01
Science and Education Administration, Clay Center, NE. Meat Animal Research Center.
Methane and Biomass Production Systems for Beef Cattle Manure
A. G. Hashimoto, R. L. Prior, and Y. R. Chen. 1978, 25p

Keywords: *Animal feeds, *Manures, *Methane, Amino acids, Anaerobic digestion, Biosynthesis, Cattle, Chemical composition, Comparative evaluations, Digestion, Histidine, Lysine, Methionine, Nitrogen, Nutrients, *Proteins, Research programs, Single cell protein, Soybeans, Time dependence, Waste product utilization.

The research being conducted at the US Meat Animal Research Center to convert livestock manure into methane and a high protein feed ingredient by thermophilic anaerobic fermentation is summarized. The pilot scale fermentor is 5.7 m exp 3 with working volume between 5.1 to 5.4 m exp 3 . Fermentation was started by adding fresh beef manure to previously heated tap water and maintaining the pH above 7. Gas production increased dramatically within nine days after start up, demonstrating the relative ease in initiating anaerobic fermentation of livestock manures. The results showed that the total solids, volatile solids and COD reduction decreased as the retention time decreased; the fixed solids and total nitrogen were not lost during fermentation; and the total gas and methane production increased as the retention time decreased. Kinetic constants for the generalized substrate utilization model were determined and were in close agreement with previously reported results. Experimental results agreed well with values predicted by the model. High protein biomass from the fermentation is being recovered through centrifugation and by direct incorporation into the ration. Possible disadvantages are high ration moisture content and more feed production than the number of animals needed to produce manure for the fermentation. Amino acid analysis shows that the fer-

mentor effluent compares favorably with soybeans and that the centrifuged cake compares favorably with alfalfa hay. Feeding trials using dried centrifuge cake showed that the digestibility of dry matter, organic matter, and nitrogen tended to decrease slightly as the amount of cake in the ration increased. Preliminary results of the feeding trial using fermentor effluent mixed with corn and hay show that the fermentor effluent is utilized as well as soybean protein. (ERA citation 05:037795)

DOE/TIC-11291 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Energy Extension Service.
EES Small Business Handbook
1980, 71p

Keywords: Energy extension service, *Small businesses, Alabama, Connecticut, Energy conservation, Evaluation, Manuals, Michigan, New mexico, Pennsylvania, Tennessee, Texas, Washington, Wisconsin, Wyoming.

As part of a nationwide effort to reduce dependence on foreign oil and to limit our vulnerability to supply disruptions, Congress enacted the National Energy Extension Service Act in June 1977. This Act authorized an initial 19-month pilot program to be followed by a national program, which was initiated in August 1979. Highlights of the Energy Extension Service (EES) program and the allocation of EES financial assistance for calendar year 1980 are contained in appendix A. All of the ten EES pilot States carried out energy-outreach programs for small business. This Small Business Handbook provides information on developing, organizing, staffing, and managing small-business energy-conservation programs including education, extension, and information activities. The Handbook is intended for use as a guide primarily by new EES States and State Energy Conservation Program (SECP) managers. Although the material in the Handbook is oriented toward energy-related programs for small business, other State users may find the Handbook of value in planning other programs for small businesses. An evaluation of the EES pilot program was initiated in 1977. The resulting report described the first year's activities in 10 Pilot States and reflected which of the 20 emphasis programs work best and why. The Small Business Handbook, building on the portion of the evaluation report dealing with small business and other documentation, addresses the types of management, organization, and implementation techniques that worked best in selected states. The Handbook addresses how these techniques can be employed by others to increase the probability of success when new small-business programs are established. (ERA citation 05:038278)

DOE/TIC-11420 PC **A04**/MF **A01**
Wisconsin Energy Extension Service, Madison.
Making of a Solar Village
W. S. Becker. 1980, 52p
Contract W-31-109-ENG-38

Keywords: Commercial buildings, Shopping centers, Education, Energy conservation, *Solar energy, *Community development, Legal aspects, Planned communities, Planning, Public opinion, Public relations, Solar space heating, Wisconsin.

The development of a solar-heated central business district in Soldiers Grove, Wisconsin, is described. The following topics are covered: planning, citizen involvement, making a master plan, choosing building designs, legal tools, problems, and other communities trying similar techniques. (ERA citation 06:013646)

DOE/TIC-3363 PC **A99**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Energy: Social and Economic Aspects. A Bibliography
M. C. Grissom, and L. M. Thompson. Jul 80, 952p

Keywords: *Energy source development, Resource development, Socio-economic factors, Bibliographies, Economic impact, *Electric power, Fossil fuels, *Geothermal energy, Hydrogen fuels, Nuclear energy, Power plants, Production, Renewable energy sources, Social impact, *Solar energy, Synthetic fuels.

This bibliography contains 3832 citations, most with abstracts, from the DOE Energy Data Base concerning social and economic impacts of energy and resource development. The period from January 1975 through June 1980 is covered. References include books, monographs, journals, and reports. Included are references to impacts from the development and utilization of fossil fuels, nuclear energy, hydrogen, synthetic fuels, electric power, solar energy, geothermal energy, and other renewable energy sources. (ERA citation 06:012825)

DOE-tr-167 PC **A10**/MF **A01**
Rural Use of Biogas
1976, 209p

Keywords: Anaerobic digestion, Chemical reactors, *Methane, *Agricultural wastes, *China, Biosynthesis, Construction, Design, Energy sources, Maintenance, *Manures, Rural areas, Safety, *Bioconversion, Translations, Manuals, Synthetic fuels, Manufactured gas.

A manual on the production and use of biogas in the rural areas of China is presented. The importance of biogas production for improving the agricultural level is stressed and its properties are explained. The basic principles in the construction and maintenance of a biogas plant are given. Detailed explanations are then given for constructing and repairing various models of biogas tanks. Methods of using biogas and safety considerations in its production and use are outlined. Data are given on various construction materials, so that locally available materials can be used. (ERA citation 04:040493)

DOE-tr-184 PC **A07**/MF **A01**
Serious Management of Biogas
Mar 79, 136p

Keywords: *Methane, Organic wastes, Anaerobic digestion, Biosynthesis, Energy policy, Energy sources, *Agricultural wastes, *Waste disposal, *Bioconversion, Translations, *China, Agricultural wastes, Solid wastes, Manufactured gas, Synthetic fuels.

A collection of 17 articles, translated from the Chinese, are compiled. They deal with the experiences of various Chinese provinces and regions in developing the use of biogas (methane and carbon dioxide mixture) obtained from the anaerobic digestion of domestic and agricultural wastes. Problems encountered and solutions found are indicated. The biogas is used for cooking and lighting purposes in Chinese farms and villages. Government policy in promoting its use is emphasized. (ERA citation 04:042515)

DSE/1024-1 PC **A04**/MF **A01**
Alabama Univ. in Huntsville. Center for Environmental and Energy Studies.
Listing of Solar Radiation Measuring Equipment and Glossary
E. A. Carter, S. A. Greenbaum, and A. M. Patel. Jul 76, 54p Rept no. ERDA/NASA/31293-76/3
Contract NAS-8-31293

Keywords: Solar flux, Insolation, Calorimeters, Cost, Measuring instruments, Photometers, Photovoltaic cells, Pyranometers, Pyrheliometers, Radiometers, Tables, *Solar energy, *Instruments, Solar radiation, Radiation measuring instruments, Performance(Evaluation).

This report is organized to list and provide all available information about solar radiation measuring equipment which are being manufactured and are available on the market. The list is in tabular form and includes sensor type, response time, cost data and comments for each model. A cost code has been included which shows ranges only, due to price fluctuations and because some manufacturers are reluctant to publish their prices. In some instances a price is given for a particular date, but this is subject to change at the manufacturer's or dealer's discretion. An equipment vs. cost matrix for that equipment for which cost information is available is presented. Diagrams of insolation and basic instruments used in the measurement of solar radiation are included. A form has been designed to provide a complete profile and intended applications for each model of equipment on the market. This form was developed during the course of the research period to standardize and organize all pertinent data for potential use in a published catalog. To further extend the information presented in the listing, an address list is provided. Every manufacturer included in the equipment listing is identified with an appropriate address. Any additional information not included in the listing may be obtained by contacting the manufacturer. A Glossary of Solar Radiation Terms frequently used with solar radiation measurement and equipment is included. (ERA citation 02:047907)

DSE/1217-1 PC **A11**/MF **A01**
AAI Corp., Baltimore, MD.
Solar Industrial Process Hot Water as Used to Cure Concrete Blocks. Final Report
Jan 77, 237p
Contract EY-76-C-03-1217

Keywords: *Concrete, Solar kilns, Concentrating collectors, Cost, Design, Economics, Heat exchangers, Performance, Process heat, Production, Research programs, Sensible heat storage, *Solar energy, Steam, Steam generators, Tanks, Water, *Solar water heating, Solar collectors, Concrete blocks.

The Phase I program and the design plan for the Phase II Experiment Integration wherein the AAI Corporation's 24/1 concentrating collector is used to produce hot water to cure concrete blocks is described. This concept has a tremendous potential since each block requires about 1500 Btu for curing at a temperature of 140 exp 0 F to 180 exp 0 F. To demonstrate this process, the solar hot water system will be installed at the new block fabricating plant being built by the York Building Products Co., Inc. at Harrisburg, Pa. A circular underground curing tank will be the storage tank for the solar system. Since the plane is new, no retrofitting is required. The collectors will be mounted on the roof of the new block producing facility. A full-scale 256 ft exp 2 module of the 24/1 collector has been built and tested by AAI Corporation. A 9216 ft exp 2 array of collectors is required for this experiment. AAI Corporation is pursuing a development program planned to culminate in the marketing of the 24/1 collector at a selling price of $7 to $10 per square foot. The collector is built in 9 ft by 34 ft modules and is self-supporting with pads located at the four corners. It can be inclined at the most favorable angle for solar performance, and can be located on a roof, or as a separate unit on the ground. A final design and performance analysis and an economic analysis are presented. (ERA citation 02:045293)

DSE-4042-T15 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy for Agricultural and Industrial Process Heat
22 Jun 79, 30p
Contract EG-77-C-01-4042

Keywords: Industry, Solar process heat, Demonstration programs, Forecasting, Government policies, Technology assessment, US DOE, *Process heat, *Solar energy, *Agriculture.

A state-of-the-art review of solar process heat is given; near term prospects are discussed; and the federal solar industrial process heat program is reviewed. Existing solar industrial process heat projects are tabulated. (ERA citation 05:011676)

EIS-AA-72-5805-D PC **E05**
Agricultural Stabilization and Conservation Service, Washington, DC.
Rural Environmental Assistance Program
Draft environmental impact statement.
5 Dec 72, 116p USDA-ASCS-ES(Adm)-73-1, ELR-5805

Keywords: *Environmental surveys, Conservation, United States, *Puerto Rico, Virgin Islands, Soil conservation, Water conservation, Forest land, Wildlife, Pollution, Abatement, Rural areas, Construction, Vegetation, Soil erosion, *Environmental impacts, Environmental impact statements.

The report describes the Rural Environmental Assistance Program, the Federal Government shares with farmers and ranchers and the cost of carrying out approved soil, water, woodland, and wildlife conservation and pollution-abatement practices on their land. The program places emphasis on the carrying out of long-term, enduring conservation and pollution-abatement measures on farm and ranch lands in all States, Puerto Rico, and the Virgin Islands. The program will speed up and/or make possible the carrying out of needed conservation and environmental protection and enhancing measures in rural America. The impact on the environ-

ment will be beneficial and largely cumulative. The stimulus of this program sets in motion total direct investments in a wide variety of conservation and pollution-abatement practices, by close to a million farmers and ranchers a year, amounting to double the public contribution. Adverse environmental effects of major consequence would not be anticipated, if good management is carried out by program participants. Some minor adverse environmental impacts may occur during the construction of water storage facilities, terraces, diversions, pollution-abatement, and other such measures, and during the establishment of vegetative cover and tree plantings because of soil being open for a short period of time to potential erosion and noise from construction and tillage equipment. (Author)

EPRI-ER-746-SR PC A05/MF A01
Electric Power Research Inst., Palo Alto, CA.
Biofuels: A Survey
J. R. Benemann. Jun 78, 96p*

Keywords: Biomass, Synthetic fuels, *Bioconversion, Reviews, Combustion, Energy sources, Forecasting, Pyrolysis, Technology assessment, Thermochemical processes, Waste product utilization, *Fuels, Solid waste disposal.

Photosynthesis, plant productivity, waste and residue resources, "energy farming," processes for using biomass directly or converting it to fuels, and overall economics are discussed. Applications by U.S. industries and utilities are emphasized and current U.S. research and development programs presented. With foreseeable technologies and economics, approximately 5% of the fossil fuels now consumed in the United States could presently be replaced by available forestry, agricultural, and municipal wastes and residues. Additional resources could be generated through optimization of agricultural and forestry residue production, use of noncommercial forests, and purposeful cultivation of plants for fuel production. Direct combustion, to produce electricity and/or steam, is the best developed and most widely applicable process for using low-moisture biomass. Biomass could become a supplemental fuel for some coal-fired power plants. The conversion of biomass to gaseous and liquid fuels by thermal or biological processes is technically feasible; however, the economics must be improved for widespread applications. Biofuels will be most widely used by current biomass producers (agriculture and forestry) and by small to medium-sized industries and towns located near available resources. The multiplicity of biomass resources and biofuel applications suggests that no single end use will predominate. (ERA citation 04:002697)

ERDA-tr-288 PC A02/MF A01
Universidad de los Andes, Orinoco (Colombia).
Center for the Integral Development of "Las Gaviotas"
21p
Translation: source information not available.

Keywords: *Dams, Hydroelectric power plants, Colombia, Construction, Design, Hydraulics, *Hydroelectric power, Pipelines, Pumps, Research programs, Rural areas, Solar energy, Solar water heaters, Technology utilization, Transport, Water, Wind turbines, Translations.

The following research projects in Colombia, are described briefly: development and use of 0.5 to 1.0 kW hydraulic turbines for rural hydroelectric power generation; water pipeline construction; construction of small dams; water pump design; wind mill design; development of solar water heaters; testing of hydraulic rams; an earth-cement solar reflector; and design of a cassava shredder. (ERA citation 03:023340)

ERDA-tr-298 PC A03/MF A01
Inter-American Development Bank, Washington, DC.
Contribution to the Analysis of the Development of Unconventional Energy Sources in Latin America
I. Escobar, and M. E. Ibacache. Apr 77, 32p
Translation of Spanish report.

Keywords: Biomass, *Geothermal energy, *Wind energy, MHD generators, Photovoltaic cells, *Solar energy, Wind power, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and obago, Uraguay, Venezuela, Education, Energy policy, *Energy source development, Energy sources, Fossil fuels, Nuclear energy, Personnel, *Bioconversion, *Photovoltaic power system, Translations, Spain, Latin America, Foreign countries.

The energy demand for Latin America will be satisfied by the end of the present century mainly through utilization of its conventional hydraulic and fossil resources. Nuclear energy will experience a great development in Argentina, Brazil, and Mexico in the coming 20 years. The electronuclear alternative in other Latin American countries will be considerable depending on the degree of industrialization, geographical location and the possibilities for interconnecting networks for transmission and distribution of electrical energy in the country considered and depending on reduction in design scale and savings made in nuclear reactors presently in use (dropping down to capacities of about 150 MW per plant). The development of wind energy, thermal gradient of the ocean, solar energy, photovoltaic cells, processes of photosynthesis, MHD energy, geothermal energy, and tidal power as energy sources is discussed. (ERA citation 03:008613)

ERDA-77-47/2 PC A04/MF A01
Energy Research and Development Administration, Washington, DC. Div. of Solar Energy.
Solar Program Assessment: Environmental Factors. Solar Agricultural and Industrial Process Heat
Mar 77, 56p

Keywords: *Agriculture, Industrial plants, *Process heat, *Environmental impacts, Air quality, Animal shelters, Construction, Environmental effects, Greenhouses, Land use, Noise, Safety, Solar air heaters, Solar collectors, Solar drying, Solar energy, Solid wastes, Steam generators, Thermal pollution, Water quality, *Solar heating systems.

The major environmental issues associated with the further development of solar energy as a source of process heat in the industrial and agricultural sectors are presented and prioritized. Agricultural and industrial heating represents the specific application of a variety of Federally-funded solar technologies. To provide a background for this environmental analysis, the basic concepts and technologies of solar process heating are reviewed. The potential effects of these applications of solar energy on the full range of environmental concerns (e.g., air and water quality, biosystems, safety, social/institutional structures) are then discussed in terms of both their relative significance and possible solutions. Although the development of solar energy as a source of process heat will contribute to some environmental problems common to construction projects and energy-producing technologies (e.g., construction noise, thermal discharge to the air and water), only those impacts unique to the solar portion of the technology are discussed in depth. Finally, an environmental work plan is presented, listing research and development proposals and a National Environmental Policy Act (NEPA) document work plan which might help clarify and/or alleviate specific environmental and safety problems. (ERA citation 02:048094)

ERDA-77-79 PC A05/MF A01
Energy Research and Development Administration, Washington, DC. Office of Planning, Analysis, and Evaluation.
Managing the Socio-Economic Impacts of Energy Development: A Guide for the Small Community
Sep 77, 82p
Contract EA-77-C-10-0037

Keywords: Communities, *Energy source development, Socio-economic factors, Boom towns, Decision making, Economic growth, Economic impact, Economics, Employment, Environmental impacts, Evaluation, Government policies, Income, Information, Local government, Management, Planning, Public health, Recreational areas, Residential sector, Safety, Social impact, Solid wastes, State government, USA, Waste disposal, Water resources, Water treatment, *Socio-economic status, Guidelines, Handbooks.

A decision concerning large-scale energy development is usually a complex one requiring cooperation of all levels of government as well as the general public and the private sector. The purpose of this handbook is to provide local officials with guidance regarding how they may assess, plan, and manage the socio-economic impacts of such development. Key areas of discussion in this report include: employment; personal income; housing; education; transportation; water supply; solid waste collection and disposal; waste water treatment; health care; recreation; and safety. It is unrealistic to expect the typical small community to develop capabilities to independently evaluate a highly technical development which to them is a one-time occurrence. Thus, local officials must be aware of resources which they may tap for information and assistance at other levels of government. This handbook advises local officials on how they should organize to most effectively participate in assessing, planning, and managing energy development and how to insure that information is collected and analyzed to reflect local priorities and future planning needs. (ERA citation 03:031111)

E80-10093 PC A05/MF A01
Lockheed Electronics Co., Inc., Houston, TX. Systems and Services Div.
Crop Phenology Literature Review for Corn, Soybean, Wheat, Barley, Sorghum, Rice, Cotton, and Sunflower
Technical rept.
T. Hodges, and P. C. Doraiswamy. Nov 79, 91p LEC-13722, JSC-16088
Contract NAS9-15800
Sponsored in part by Department of Agriculture, Washington, DC., Department of Commerce, Washington, DC., and Department of the Interior, Washington, DC.
Report on AgRISTARS.

Keywords: Corn, *Soybeans, *Wheat, Barley, *Rice, Cotton, Phenology, Grasses, Grains(Food), Crop growth, Agriculture, Agrometeorology, Soil moisture, Earth Resources program, Mathematical models, Regression analysis, *Cotton plants, *Crops, *Plants(Botany), *Sunflower, Farm crops.

No abstract available.

HCP/M3879-0003 PC A03/MF A01
Resource Planning Associates, Inc., Washington, DC.
Comprehensive Community Planning for Energy Management and Conservation: Developing and Applying a Coordinated Approach to Energy-Related Community Development. Executive Summary
Dec 77, 36p
Contract EX-76-C-10-3879

Keywords: Communities, Energy source development, North Dakota, Economic impact, Efficiency, *Energy conservation, Energy consumption, *Energy management, Environmental impacts, Europe, Financing, France, Human populations, Land use, National energy plan, Planning, Recovery, Rural areas, Social impact, Socio-economic factors, Waste heat.

This executive summary highlights and condenses the report HCP/M-3879/1, Vol. 1, which analyzes the community-development process and formulates an organizational approach to resolving the institutional and financial issues arising from energy-related community development. (ERA citation 03:021682)

HCP/M3879-1(V.1) PC A07/MF A01
Resource Planning Associates, Inc., Washington, DC.
Comprehensive Community Planning for Energy Management and Conservation: Developing and Applying a Coordinated Approach to Energy-Related Community Development. Volume I
14 Oct 77, 140p
Contract EX-76-C-10-3879
See also HCP/M-3879-0003

Keywords: Communities, Energy source development, North Dakota, Economic impact, *Energy conservation, *Energy management, Environmental impacts, Europe, Financing, France, Human populations, Land use, National Energy Plan, Planning, Recovery, Rural areas, Social impact, Socio-economic factors, Waste heat, Mercer County(North Dakota).

To achieve the objectives of ERDA's Community Systems Program, physical and institutional characteristics that determine a community's levels and patterns of energy use must be defined and methods of coordinating its energy systems established. In Chapter 1, Managing Rapid Growth to Achieve the Goals of Energy-Related Community Development, the goals are identified and the development activities and man-

agement functions constituting an effective approach to achieving them are defined. The characteristic problems of rapid growth are described and their causes traced. In Chapter 2, Identifying Elements of a Community-Development Approach Applicable to the Rapid-Growth Context, a number of domestic and European community-development approaches that might be applicable to managing rapid growth in the boomtown context are surveyed. Applicable elements of a number of U.S. mechanisms and of two French community-development approaches that can serve as the basis for formulating an organizational approach are identified. In Chapter 3, Formulating a General Community-Development Approach, the effectiveness of the approach, its adaptability to the boomtown context, and its capability for achieving the goals of energy-related development are demonstrated. In Chapter 4, Adapting the General Approach to Mercer County, North Dakota, the complex rapid-growth situation in Mercer County, North Dakota, is described. Chapter 5 is entitled, Defining the Limitations of the Mercer County Approach and the General Approach. The content of Volume I is supplemented and supported by a series of appendixes, assembled in Volume II. (ERA citation 03:021681)

HCP/M4038-01(Rev.) PC A09/MF A01
Sheet Metal and Air Conditioning Contractors National Association, Vienna, VA.
Fundamentals of Solar Heating: Correspondence Course
Aug 78, 190p
Contract EG-77-C-01-4038

Keywords: *Solar heating systems, Solar water heaters, Education, Control systems, Design, Flat plate collectors, Heat storage, Insolation, Installation, Legal aspects, Maintenance, Manuals, Operation, Size, *Solar collectors, *Solar cooling systems, Solar radiation, *Solar water heating.

This revision is the August 1978, reprinting of HCP/M4038--01 which has appeared previously. (ERA citation 04:005563)

HCP/M4038-02 PC A06/MF A01
Sheet Metal and Air Conditioning Contractors National Association, Vienna, VA.
Study Guide for Fundamentals of Solar Heating. A Correspondence Course for the Airconditioning Industry
Jan 78, 118p
Contract EG-77-C-01-4038

Keywords: *Solar heating systems, *Solar water heating, Manuals, Education, Educational tools, Reviews, *Solar cooling systems.

The study guide to accompany the correspondence course (HCP/M4038--01) groups the eleven lessons into four study units. There are review tests and unit examinations, structured for assistance in reviewing the material and in integrating new information with that learned previously. (ERA citation 03:032908)

HCP/T2981-07 PC A20/MF A01
Cornell Univ., Ithaca, NY.
Anaerobic Fermentation of Agricultural Residue: Potential for Improvement and Implementation. Final Report
W. J. Jewell, H. R. Capener, and S. Dell'orto. Feb 78, 456p
Contract EY-76-S-02-2981

Keywords: *Agricultural wastes, Anaerobic digestion, Chemical reactors, *Manures, *Methane, Agriculture, Bench-scale experiments, Biodegradation, Biomass, Biosynthesis, Chemical reaction kinetics, Cost, Design, Energy sources, Feasibility studies, Fermentation, Flow rate, Fluid flow, Forecasting, Gas flow, Nutrients, Recommendations, Research programs, Socioeconomic factors, Tables, Temperature effects, Thermophilic conditions, *Bioconversion, Synthetic fuels, Manufactured gas, Solid waste disposal, Biological energy conversion.

The results of studies designed to evaluate the potential of rapidly improving the technology of anaerobic fermentation of agricultural residues and methods of implementing it in existing agricultural operations are reported. The main objectives of this study were to: identify simple and low cost anaerobic fermentor design criteria that would be appropriate in small agricultural operations, develop high rate fermentor concepts that would enable multiple product recovery from the reactor, expand the information base particularly in the area of temperature influence on the process, and to review sociological and economic issues relating to implementation of fermentation technology. This study has identified several major anaerobic fermentation concepts which illustrate that the technology may be rapidly improved. A simple reactor design utilizing an unmixed plug flow concept was shown to be comparable to the more complex completely mixed reactor when using dairy cow residue. A high rate thermophilic reactor designed to encourage flotation of particulate solids illustrated that liquid, solid, and gaseous products can be generated within the anaerobic fermentor thus eliminating an additional dewatering unit process. A third reactor concept involved extension of the anaerobic attached microbial film expanded bed to the treatment of cow manure slurries. A high rate of methane generation was recorded. Comprehensive thermophilic fermentation studies (60 exp 0 C) indicated that the increased temperature resulted in little improvement in total quantity or the rate of yield of gas over that obtained with mesophilic fermentation with reactor retention periods greater than 10 days. Finally, other areas where preliminary date were obtained are noted. (ERA citation 03:030554)

HCP/T4101-03 PC A05/MF A01
MITRE Corp., McLean, VA. METREK Div.
Biomass-Based Alcohol Fuels: The Near-Term Potential for Use with Gasoline
W. Park, G. Price, and D. Salo. Aug 78, 84p
Contract EG-77-C-01-4101

Keywords: *Automotive fuels, *Ethanol, *Methanol, Alcohols, *Bioconversion, Biomass, Economics, Feasibility studies, Forecasting, Synthesis, Technology assessment, Thermochemical processes, *Gasohol, *Fuels, Blends, Synthetic fuels.

This report serves as an introduction to the requirements and prospects for a nationwide alcohol-gasoline fuel system based on alcohols derived from biomass resources. Technological and economic factors of the production and use of biomass-based methanol and ethanol fuels are evaluated relative to achieving 5 or 10 percent alcohol-gasoline blends by 1990. It is concluded the maximum attainable is a nationwide 5 percent methanol or ethanol-gasoline system replacing gasoline by 1990. Relative to existing gasoline systems, costs of alcohol-gasoline systems will be substantial. (ERA citation 04:005430)

HIT-693(V.2)(App.) PC A17/MF A01
Hittman Associates, Inc., Columbia, MD.
Comprehensive Community Planning for Energy Management and Conservation. First Interim Report. Volume II. Appendices
Apr 77, 391p
Contract EC-77-C-10-0023
See also HCP/M-3879-1(V1)

Keywords: Communities, Energy analysis, *Energy conservation, *Energy management, Bibliographies, Engineering, Environmental impacts, Information retrieval, Land use, Planning, Reviews, Rural areas, Sociology, Systems analysis, Urban areas, State of the art.

This research effort performs a thorough survey of the state-of-the-art in each of the fields related to the community planning project for energy management and conservation. Appendix A describes the results of that survey. In attempting a major, interdisciplinary research and development project such as this one, it is necessary to integrate theory and practice from several fields. These include land use planning, political science, public administration, urban development, mechanical engineering, systems analysis, and the atmospheric sciences. The survey of current knowledge that was performed resulted in three major outputs. The first is an extensive bibliography of printed materials which are related to this project. The bibliography is presented as Appendix B at the conclusion of this document. The second major product of this task is an extensive set of abstracts of those relevant materials reviewed; this set of abstracts forms Appendix C. The third output of the survey is a set of reports of personal contacts with individuals or organizations that were either already working in the field of community energy analysis or were working in related fields. All contacts made were documented and contact reports are included in Appendix D. Appendix E is a description of community decision-making processes. (ERA citation 03:018384)

HRP-0009927/5 PC A06/MF A01
Bureau of Community Health Service, Rockville, Md. Office for Family Planning.
Practical Suggestions for Family Planning Education
1975, 101p Rept no. DHEW/PUBL/HSA-75/16007
Contract PHS-HSM-110-73-477

Keywords: *Health education, Health care delivery, Family planning, Strategy, Sources, Plans, Methodology, Information systems, Health planning, Health care, Documents, Consumers, Biomedical information systems, Availability, Objectives, *Birth control, *Population control.

Educational activities within a family planning program are discussed in a report prepared under contract to DHEW's Bureau of Community Health Services. It is assumed that in-clinic education is important in family planning programs, and, based on this assumption, techniques for developing a family planning education program are suggested. Such techniques include problem identification and analysis, resource identification and use, and educational plan development. The goals and objectives of an educational plan are noted, and a checklist is provided for evaluating a family planning education program. The selection, development, and use of family planning educational materials are addressed, with emphasis on the advantages of educational materials, educational material guidelines, selecting from among family planning educational materials (printed, visual, and audiovisual materials), development of family planning educational materials, and appropriate use of materials. A model is described for the development of contraceptive educational materials which covers birth control pills, intrauterine devices, diaphragms, contraceptive creams and jellies, contraceptive foams, voluntary sterilization, and rhythm. A bibliography of family planning materials is provided.

HRP-0013242/3 PC A05/MF A01
Westinghouse Electric Corp., Columbia, Md. Population Center.
Guidebook for Family Planning Education
Sigrid G. Deeds. Dec 73, 95p

Keywords: *Health education, Family planning, Strategy, Social services, Project planning, Preventive medicine, Patients, Methodology, Health planning, Health care services, Education, Consumers, *Birth control, *Population control.

Guidelines for designing and improving educational components of family planning programs are presented in a manual directed to the educational specialist or person responsible for the educational services of a family planning program. Methods and techniques for assisting couples in developing positive attitudes and behavior in regard to family planning are discussed. The manual, which is intended as a general framework for planning, provides direction in charting an educational plan and in taking the first steps toward implementing the plan. The opening section touches on aspects of educational relationships and distinctions, including education versus information; communication in educational planning; attitude and behavior change; public relations versus education; counseling, interviewing, and consulting; training; definition of the educational component in family planning programs; the role of the educational staff; and qualifications for a family planning educational coordinator. Steps in the planning process are described in detail, followed by suggestions concerning the selection of educational methods and materials. The closing section presents an overview of the use of a variety of educational methods and materials in family planning programs. Lists of references are provided throughout the manual, and selected sources for family planning information (films, slides, tapes, catalogs, materials lists, periodicals) are also listed.

HRP-0013245/6 PC A09
Michigan Univ., Ann Arbor. School of Public Health.
Some Health Sector Analysis Methods for Developing Nations
Lawrence H. Stiffman. May 74, 185p

Keywords: *Health planning, System analysis, Strategy, Quality assurance, Methodology, Measurement, Health care, Health care utilization, Health care facilities, Health care costs, Forecasting, Data processing, Data processing systems, Data analysis, Cost effectiveness, Benefit cost analysis.

Quantitative methods and techniques for health planning and management are described in a manual directed to developing nations. The catalog of health sector analysis methods has two purposes: (1) to present a selection of past analyses of components of the health sector; and (2) to evaluate these analyses in terms of their ability to identify choices in allocating scarce resources among competing objectives, activities, or strategies; to evaluate the consequences of alternative decisions in terms of health, economic improvement, and cost; and to identify the preferred alternative given available information, skills, and resources. Application of health sector analysis techniques is described at the national, regional, single facility, and single program level. The manual opens with a discussion of the constraints in using quantitative methods and techniques. Program budgeting applications are then described in both developed and developing countries, and examples of cost-effectiveness analysis are offered for cholera and malaria. Forecasting and operations research techniques are described at the health program management level. Examples are presented of methods for identifying data, organizing data into information, and analyzing and managing information in decisionmaking. Methods included are time series analysis, regression analysis, simple population and utilization projections, queuing and inventory theory, and network analysis. Analytic or optimizing models, including linear and dynamic mathematical programming and Markovian analysis, are described. Allocation models are described for decisionmaking in regard to tuberculosis, allocating, personnel moving patients, and environmental health. Supporting data, graphs, flow diagrams, and a bibliography are included.

HRP-0016123/2 PC A04/MF A01
Pan American Health Organization, Washington, DC.
Guide for the Organization of Health Services in Rural Areas and the Utilization of Auxiliary Personnel
1975, 72p
Paper is the recommendations of two PAHO/WHO Working Groups convened in Washington, D.C., in April 1974.

Keywords: Rural health services, *Health planning, Sanitation, Rural areas, Policies, Pediatrics, Objectives, Methodology, Health resources, *Health manpower, Health care services, Guidelines, Foreign countries, Environmental health, Children, Child health services.

The overall objective of the two multidisciplinary working groups of the Pan American Health Organization was to develop a methodology for planning, organizing, and controlling programs in order to extend the coverage of health programs in rural areas. An organizational methodology is proposed for the extension of health service coverage to rural areas. The methodology is programmatic and involves an analysis of the situation, the definition of objectives and target populations, the determination of requirements, and execution. The proposed rural health program has three subprograms: (1) health care (maternal and child health and other direct health activities); (2) basic sanitation (water and excreta); and (3) statistics (statistics for health services and vital statistics). The role of rural communities in the utilization of health services and the implementation of the proposed rural health program is discussed. Functions and training requirements for auxiliary personnel working in rural areas are identified. Data are tabulated on the assignment of tasks in a rural health program. The infrastructure of the proposed rural health program is detailed, with emphasis on planning, organization, execution, control, and supervision. Forms and guidelines are included for the conduct of a rural health program. A list of references is provided.

HRP-0027818/4 PC A05/MF A01
CPI Associates, Inc., Dallas, TX.
Health or Wealth -- Reassessment of an Old Dilemma
17 Jul 78, 94p

Keywords: Health economics, Economic studies, Economics, Foreign countries, Health care, Health status, Economic development, Measurement, Methodology, *Health, *Health planning.

Three essays focusing on the relationship between health needs and the need for economic development in less developed countries are presented. It is suggested that less developed countries try to equalize the distribution of health-related expenditures for different groups in the population. The inequity of health expenditures is more important than the actual amount spent. It is suggested that public sector spending for health services be increased. A long-term commitment to economic development should be undertaken as a strategy for improving health. Examples of the health versus development dilemma are provided. The many issues associated with the definition and measurement of the health of a nation's population are summarized. The uses and limitations of various methods of measurement are discussed, as are some of the key issues in the health and development problem. It is recommended that a systems analysis approach to health problems in developing countries be utilized.

HRP-0028073/5 PC A08/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. IX -- Dominican Republic
Karen E. Lashman, and John A. Daly. Jun 74, 169p Rept no. DHEW/PUB/OS-74/50005

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in the Dominican Republic are analyzed. The following characteristics of the Dominican Republic are examined: geography, climate, history, political structure, communications, transportation, religion, language, education, economy, social structure, health attitudes, rural life, urban life, and housing. Population characteristics -- migration, age, sex, ethnic composition, and marital status -- are also considered. Health status is assessed in terms of mortality, communicable diseases, zoonoses, chronic diseases, mental health, and causes of hospitalization. Attention is given to national health and development planning, public health service agencies, environmental services, nutrition, population program activities, health programs of international organizations, medical services and facilities, health manpower resources, and medical care financing and costs. Family planning has been officially recognized as the most urgent national health priority. Health-related data and a bibliography are included.

HRP-0028075/0 PC A06/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XI -- Nicaragua
B. Holland, J. Davis, and L. Gangloff. Nov 73, 113p Rept no. DHEW/PUB/OS-74/50007

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Nicaragua are analyzed. Background information is presented that concerns the physical setting of Nicaragua, education, the economy, the characteristics of the population, and the impact of the 1972 earthquake. Health status is examined in terms of general indicators, mortality data, morbidity data, and the quality of data. Special programs are described, including maternal and child health, family planning, nutrition, environmental sanitation, immunization coverage, and disease-specific programs (malaria and tuberculosis). The organization of health services is considered in relation to health agencies (Ministry of Public Health, National Board of Assistance and Social Welfare, National Guard health program, and the private sector), cooperation and planning, and pilot projects. Health resources are identified as manpower, training, medical care facilities, and health budgeting. National health planning is discussed. Recommended measures to improve health planning and statistical information, nutrition, environmental sanitation, communicable disease control, and health resources are detailed. Health-related data are tabulated, and a selected bibliography is included.

HRP-0028076/8 PC A07/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XII -- Thailand
Paul O. Woolley. Jun 74, 150p Rept no. DHEW/PUB/OS-74/50008

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Thailand are analyzed. The general characteristics of Thailand and the country's culture and economy are described. Health status is assessed in relation to demographic characteristics, patterns of morbidity and mortality, the consumption of medical services, malaria, and tuberculosis. Consideration is given to environmental sanitation, nutrition, health care services (organization and basic resources, health manpower, the availability of health care services, administrative issues, manpower training, and attitudes toward and the utilization of health care services), and external assistance. Perspectives on health planning are offered, along with recommendations dealing with the health sector, intersectoral planning, and social policy planning. Four factors are of major concern with regard to the health of Thailand's citizens: rapid population growth, sanitation and environmental hazards, malnutrition, and the allocation and utilization of resources in the health sector. The appendixes contain a listing of agencies involved in nutrition, illustrations, and tables. A bibliography is provided.

HRP-0028077/6 PC A08/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XIII -- Botswana, Lesotho and Swaziland
May 75, 158p Rept no. DHEW/PUB/OS-75/50018

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Botswana, Lesotho, and Swaziland are analyzed. Information relating to the health environment (setting, population characteristics, and health issues) is provided for each country. The determinants of health and disease are also covered, with attention given to population characteristics such as migration, distribution, employment and education, and fertility and family planning, as well as to health status as indicated by morbidity and regional disease problems and nutritional status as indicated by diet and undernutrition. Other areas dealt with include the health delivery system (infrastructure and health services, health manpower and training, maternal and child health, family planning, and nutrition and food aid programs, and health planning, organization, and financing). The appendixes provide additional information on the geography, climate, political development, economic development, and educational system in the three countries. A bibliography is included at the end of the descriptive sections about each country.

HRP-0028079/2 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XVII -- Bangladesh
Scott A. Loomis. Mar 76, 99p Rept no. DHEW/PUB/OS-76/50035

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

The relationship between socioeconomic development and health in Bangladesh is analyzed. An overview of the Bangladesh health sector is presented that encompasses national health policy, health services, health resources, environmental sanitation, health financing, and international donor (assistance) agencies. Background information on the country's geography, climate, history, governmental structure, economy, transportation, communication, education, housing, and cultural environment is given. Population characteristics are described in terms of distribution, migration, age, sex, ethnic composition, and marital status. Health status is assessed with respect to mortality, communicable diseases, and morbidity. Consideration is given to nutrition, national health policy and administration, Government and private health services and programs, population programs, environmental sanitation, health sector resources, health care financing, and donor assistance (multilateral, bilateral, and nongovernmental organizations). Bangladesh's most critical problem is the need to control fertility. Infectious diseases and malnutrition are also significant problems. A bibliography is provided.

HRP-0028080/0 PC A08/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XVIII. -- Islamic Republic of Pakistan
Arthur H. Furnia. Jun 76, 159p Rept no. DHEW/PUB/OS-76/50036

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Pakistan are analyzed. The health environment in Pakistan (problems, issues, and policies) is characterized. Health risks, diseases, and other problems affecting the health environment are noted. The organization and functioning of the health system are detailed. Health manpower resources, population and family planning, nutritional deficiencies, maternal and child health care, environmental inadequacies and malaria control, dental health, mental health including narcotics control, and health system financing are addressed. The poor health environment of Pakistan appears to be the result of three fundamental factors: widespread infectious and communicable diseases, poverty and sociocultural attitudes that inhibit environmental improvement, and ineffective policies administered by a limited number of inadequately trained health workers that affect both the urban poor and the rural population. Increased assistance is needed in the following areas: reorganization of the Ministry of Health and Provincial health departments, environmental sanitation and hygiene, expanded health education curriculums in primary and secondary schools, and auxiliary health worker training. Additional information on sociopolitical characteristics of Pakistan and its population is appended. A bibliography is included.

HRP-0028081/8 PC A08/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XIX -- Senegal
Robin J. Menes. Jun 76, 161p Rept no. DHEW/PUB/OS-76/50037

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Senegal are analyzed. Background information encompasses geography, climate, the political structure, education, communication, transportation, language, religion, and the economy. The demographic characteristics of the population are described in terms of population dynamics, migration patterns, ethnic groups, marital status, population planning, and international assistance for family planning. Health status is assessed with regard to mortality, communicable diseases, chronic diseases, dental health, mental health, and zoonotic diseases. Consideration is given to the nutritional status of residents in the country, environmental health, health facilities and services, health manpower, national health policy and planning, and international organizations. Many serious diseases have been suppressed by mass immunization programs, but malaria, measles, tuberculosis, trachoma, and venereal disease are still present at high levels. There is a high infant and childhood mortality rate, environmental sanitation is almost nonexistent outside major cities, and health services are inadequate and inefficient. Nutrition appears to be good on the average. There is an obvious shortage of health manpower. Health and development planning operates under several handicaps; one is the fact that the Ministry of Health and Social Affairs plays almost no role in planning. A commitment has been made to upgrade rural health services, but implementation has been slow due to a lack of funds and an uncertain plan of action. A bibliography is provided.

HRP-0028082/6 PC A07/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XX -- Jamaica
Arthur H. Furnia. Dec 76, 150p

Keywords: *Socioeconomic status, Communities, Data, Demography, Economic conditions, Economics, Environmental health, Foreign countries, Health care, Health occupations, Health statistics, Health status indexes, Nutrition, Public health, Sociology, *Health.

Relationships between socioeconomic development and health in Jamaica are analyzed. The health environment, health risks, diseases, and other problems affecting the health environment in Jamaica are noted. The organization and functioning of health services and delivery are detailed. Health manpower resources, population and family planning, nutritional deficiencies, maternal and child health, mental health (including drug control), dental health, the environment, and health care financing are addressed. Fundamental problems in the country, e.g., inadequate and insufficient health facilities, a shortage of health manpower widespread malnutrition, and poor dental health services, are identified. Objectives for 1980-81 concern maternal mortality and morbidity, reduction of abortions, nutrition programs for all women attending prenatal clinics, the incidence of malnutrition, preschool immunizations, neonatal deaths, examination for and treatment of cervical and breast cancer, increased clinical sessions at family planning clinics, training of community health aides and midwives, and involvement of the male population in family planning programs. The appendixes contain demographic and political information. A bibliography is provided.

HRP-0028083/4 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. XXI -- The Hashemite Kingdom of Jordan
John F. Gallivan. May 77, 69p

Keywords: Health planning, Ailments, Classifications, Communities, Demography, Diseases, Foreign countries, Health care delivery, Health care technology, Injuries, Methodology, Preventive medicine, Research, Strategies, Vital statistics, *Health.

This document on the health situation in Jordan is one of a series of reports concerned with health conditions in various countries and the effect these conditions have on socioeconomic development within the countries. Among the purposes of the studies are: (1) to provide a concise, up-to-date introduction to the health situation in a country for the use of the U.S. Agency for International Development and the international health community; and (2) to provide specialists in comprehensive health planning with a preliminary document and some indication of sources of information available for health planning within the particular country. The areas covered by the report include: the setting (e.g., the geography and climate, culture, and economy of Jordan); demographics; causes of death and illness (mortality, reportable diseases and other morbidity, nutritional deficiencies, and environmental sanitation inadequacies); the health sector infrastructure, including the Ministry of Health and health and economic planning; curative resources (traditional practices, facilities, and manpower) and prevention. A bibliography accompanies the text.

HRP-0028084/2 PC A09/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. XXII -- Kingdom of Morocco
Juliana Weissman. Jun 77, 183p

Keywords: Environmental health, Health care delivery, Communities, Demography, Foreign countries, Health education, Public health education, Public health, Research, Vital statistics, *Health, *Socioeconomic Status.

A description and analysis of the health conditions in Morocco are provided, and the relationship of those conditions to Morocco's socioeconomic development is explored. While the leading causes of death for adults are unknown, tuberculosis, eye diseases and upper respiratory and gastrointestinal infections are widespread. Morocco's general mortality rate has decreased, but the infant mortality rate has remained high. Malnutrition, particularly protein-calorie malnutrition, is prevalent among more than 50 percent of Moroccan children under the age of four. Food production fluctuates from year to year, resulting in abrupt changes in availability of supplies. Uneven food distribution is a contributing factor to the high rate of malnutrition. The organization of health services is described, and it is pointed out that dispensaries for the provision of basic curative and preventive care are underutilized. Hospitals, it is noted, are not being operated at maximum efficiency. It is suggested that a program of health education be undertaken to teach people how to cope with unfavorable environmental conditions. Nutrition education would be one of the primary components of the health education program. Outside assistance to Morocco is examined.

HRP-0028153/5 PC A08/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Syncrisis -- The Dynamics of Health. XXIV -- Afghanistan
Arthur H. Furnia. Mar 78, 175p Rept no. DHEW/PUB/OS-78/50056

Keywords: Environmental health, Health care delivery, Communities, Demography, Family planning, Foreign countries, Health care services, Personal health services, Research, Sanitation, Social services, Vital statistics, *Health, *Socioeconomic Status.

Health conditions in Afghanistan are described and analyzed and the relationship of those conditions to Afghanistan's socioeconomic development is examined. The health sector reflects dramatically the more fundamental problems that plague Afghanistan. Malaria and tuberculosis threaten life, while gastrointestinal, infectious and parasitic diseases contribute to mortality and morbidity. These diseases are widespread because Afghanistan has insufficient sanitary water supplies and waste disposal, inadequate housing and health facilities, a lack of trained health manpower, and nutritional problems. Specific problems hindering the improvement of the Afghan health sector are discussed. The Government of Afghanistan supports family planning, but not enough is actually being done. Because there is a widespread lack of environmental sanitation and personal hygiene, measles, diarrhea/dysentery, typhoid fever, intestinal helminthiasis, pneumonia, tuberculosis, eye and skin diseases and respiratory infections are prevalent. It is suggested that a substantial portion of Afghanistan's total budget could be allocated to the health sector to address the health problems of the population. Appendixes include: geographic, historical, political and economic aspects of Afghanistan, the structure of Afghan society, and a bibliography.

HRP-0028406/7 PC A02/MF A01
American Public Health Association, Washington, DC.
Influences Affecting the Role of the Village Health Worker
Gretchen Manley. 1978, 13p

Presented at the American Public Health Association, 106th Annual Meeting, Los Angeles, CA, October 15-19, 1978.

Keywords: Health resources, Assessments, Comments, Evaluation, Feasibility studies, Foreign countries, *Health care delivery, Health care, *Health manpower, Health occupations, Methodology, Research, Reviews.

Four groups that influence the effectiveness and success of the village health worker (government, medical profession, community, and workers themselves) in developing countries are considered. Village health workers may be called health auxiliaries, community clinic attendants, health agents or village health promoters. In the selection of workers, the trend is to encourage community participation. Residency of a worker in the community to be served is necessary, while age and skill requirements vary. Experience in the selection and training of workers under 25 years of age has shown that it is difficult to keep these people in the job and that respect for them is often lacking due to their youth. No consensus exists on the educational qualifications of candidates. Government is often unable to meet local needs, due to limitations of size and distance. The village health worker concept is dependent on this factor and on the expertise of medical professionals. The community is the primary reason for the existence of workers, and workers must realize that they are performing a valuable service to the community. The most successful village health worker programs are those employing a fee-for-service plan or some form of health insurance plan.

HRP-0028584/1 PC A06/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Agency for International Development (AID) Integrated Low Cost Health Projects. Volume II. Analysis
Naomi Baumslag, Chris Roesel, and Ed Sabin. Nov 78, 103p

Keywords: Family planning, Food, Foreign countries, *Health care delivery, Health care services, Health care technology, Health manpower, Health resources, Nutrition, Personal health services, Projects, Social services.

An examination is provided of the integrated, low cost primary health care delivery systems funded by the Agency for International Development (AID) in Africa, Asia, Latin America, and the Near East. The importance of integrating nutrition interventions and health and family planning services is emphasized. Integration occurs mainly through the use of multipurpose village workers and the provision of a mixture of service components. Most of the projects discussed are either still being planned or in an early stage of implementation. Thirteen of the integrated health care projects examined are in Africa, 16 are in Latin America, 7 are in Asia and 3 are in the Near East. Bolivia, Columbia, the Dominican Republic, the Philippines, Nicaragua and Thailand have two projects each. A discussion of the health backgrounds of these project countries is presented, and health care personnel are considered. Tables and figures highlight the data presented. Appendixes contain: health indicators and per capita funding; project funding and donors; health care personnel salaries, training, and titles; health care personnel -- nutrition tasks; regional frequency of nutrition and nutrition-related interventions; tables summarizing 39 AID integrated projects; and definitions of nutrition interventions used for data compilation. (Portions of this document are not fully legible)

HRP-0029149/2 PC A03/MF A01
American Public Health Association, Washington, DC. International Health Programs.
Questionnaire for Determining Practices in Health Delivery Systems in Developing Countries
1978, 28p
Contract AID-ta-C-1320

Keywords: Data collection, Data acquisition, Data processing systems, Design, Health care costs, Health care, *Health care delivery, Health planning, Measurement, Methodology, Questionnaires, Strategies, Surveys.

The questionnaire discussed in this report was developed in response to the need for descriptive information about low-cost health care delivery systems. Major emphasis is placed on different components of local health projects and innovative approaches or practices that influence such projects. Information is gathered on the population served, resources, project activities and services, how services are utilized by the population, the organizational and decisionmaking structure of projects, and ongoing evaluation activities. It is envisioned that the questionnaire will be useful to individuals who require an inexpensive method for obtaining descriptive data on the status of health programs in their countries. Nine sections comprise the questionnaire, each of which focuses on different aspects of health care delivery programs: program description, innovative practices and replication, areas of program interest and activities, volunteers and health workers involved, program facilities and outreach activities for providing direct health services, relations with other organizations and programs, community involvement, program management, and information and evaluation. The design and application of the questionnaire are detailed.

HRP-0901300/4 PC A03/MF A01
American Univ. in Cairo (Egypt). Computer Center.
Optimal Planning of Health Care Systems to Meet Social Demand and Manpower Requirements in Developing Countries. Technical Papers R/66
Amal Sami, Samir G. Boutros, and S. Aidarous. Oct 77, 29p

Keywords: *Health planning, Foreign countries, Methodology, Models, Strategies, Theories, *Health manpower.

A model is presented to aid developing countries in optimal health care planning. Problems faced by developing countries are explored, e.g., an increased demand resulting from rapid population growth and the improvement of peoples' social status. Manpower planning is stressed and the interaction between different components of the health care delivery system is considered. Difficulties that interfere with adequate health planning are discussed, including: lack of precise definitions; lack of adequate information; separation of health manpower decisions from general health planning; disassociation between health and educational planning; and bias in career selection. An explanation of the health care delivery system in Egypt is presented. A dynamic planning model which determines the optimal investment policies as well as the associated facilities allocation programs that concern manpower and hardware is presented. The data needed to run the model are examined. Figures illustrate the data.

HRP-0901304/6 PC A02/MF A01
American Univ. in Cairo (Egypt). Computer Center.
Health Planning in Developing Countries -- The 'Dependency' Concept as a Planning Aid
J. D. Macfarlane. Apr 76, 21p
Methods of Demographic Projection Analysis, Technical Paper R/36. Paper presented to the International Conference on Statistics Computation Science and Social Research (12th), April 5-8, 1976, Cairo, A.R.E.

Keywords: *Health planning, Communities, Demography, Distribution, Foreign countries, Health resources, Methodology, Models, Strategies, Theories.

A paper is presented which suggests that the friction between the viewpoint expressed by a group of planners in a developing country and the viewpoint expressed by a local group with some medical representation can be alleviated if the community dependency concept is used. A discussion of the dependency concept developed for allocating nursing resources is provided. Different ways that the community can be characterized -- whether there is a physician or a nurse in the community, the community's location with respect to the nearest inpatient facility, the nearest X-ray facility, and the nearest medical laboratory, whether there is a piped water supply, and whether there are special disease hazards in the area -- are noted. Two cases are considered to illustrate the difference between observed primary contacts and desirable primary contacts. Information concerning the dependency of the individuals in the community, the community's facilities, and the contact rate with the local physician or nurse can be used to form a hierarchical model of health care. The model will allow a side-by-side consideration of primary contact rates, mortality rates, and referral rates. A figure highlights the data. The appendix contains definitions of dependency classes.

HRP-0901729/4 PC A07/MF A01
United Nations Children's Fund, Geneva (Switzerland).
Governments and the People's Health
1978, 148p
International Conference on Primary Health Care held at Alma-Ata, USSR, on 6-12 September 1978.

Keywords: Developing countries, Socioeconomic factors, Planning, Priorities, Government, Public health, Epidemiology, *Health care delivery.

Major problems still exist in the dissemination of primary health care to all populations, particularly to women and children. This special issue contains contributions by proponents of alternative and innovative approaches to primary health care. An equitable approach to health care is urgently needed, one that involves the participation of all governments. An understanding of traditional health services is necessary in order to effectively implement a new primary health care concept. It is suggested that socioeconomic determinants and consequences have a profound effect on health and disease. Programs in agriculture, education, commerce, and industry can be designed to assure improved health care services. A planning strategy for primary health care is presented, including what data are needed and what process should be used. The epidemiology and the economic status of each country must be considered. In addition, a reorientation of health personnel, an increase in community participation, and an integration of a primary health care program into the overall national development effort are essential for a health care system to be truly effective. Case studies of primary health care in Afghanistan and other countries are provided.

HRP-0904135/1 PC A10/MF A01
Department of Health, Welfare and Pensions, Pretoria (South Africa).
Self-Help in Health
1982, 225p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Keywords: *South Africa, *Health, Hygiene, Children, Nutrition, Infectious diseases, Alcoholic beverages, Drug addiction, Elderly persons, First aid, Developing countries, Planting, Vegetables, *Health planning, *Health education.

This book describes the measures each individual can take in preventing disease, curing basic ailments and promoting good health. It also indicates what steps could be taken to create a congenial environment. In all, it provides a broad outline of what can be done to improve the quality of life.

IDO-10088(V.1) PC A07/MF A01
EG and G Idaho, Inc., Idaho Falls.
Design Report: Small-Scale Fuel Alcohol Plant
1980, 130p
Contract AC07-76ID01570

Keywords: Biomass conversion plants, *Ethanol, Construction, Cost, Design, Diagrams, *Alcohols, *Fuels, *Bioconversion, *Industrial plants, Distillation, Energy balance, Enzymatic hydrolysis, Equipment, Fermentation, Heat treatments, Idaho, Maize, Process heat, Production, Water removal.

The objectives of the report are to (a) provide potential alcohol producers with a reference design and (b) provide a complete, demonstrated design of a small-scale fuel alcohol plant. This report describes a small-scale fuel alcohol plant designed and constructed for the DOE by EG and G Idaho, Inc., an operating contractor at the Idaho National Engineering Laboratory. The plant is reasonably complete, having the capability for feedstock preparation, cooking, saccharification, fermentation, distillation, by-product dewatering, and process steam generation. An interesting feature is an instrumentation and control system designed to allow the plant to run 24 hours per day with only four hours of operator attention. Where possible, this document follows the design requirements established in the DOE publication Fuel From Farms, which was published in February 1980. For instance, critical requirements such as using corn as the primary feedstock, production of 25 gallons of 190 proof ethanol per hour, and using batch fermentation were taken from Fuel From Farms. One significant deviation is alcohol dehydration. Fuel From Farms recommends the use of a molecular sieve for dehydration, but a preliminary design

raised significant questions about the cost effectiveness of this approach. A cost trade-off study is currently under way to establish the best alcohol dehydration method and will be the subject of a later report. Volume one contains background information and a general description of the plant and process. (ERA citation 06:008762)

IDO-10088(V.2) PC A14/MF A01
EG and G Idaho, Inc., Idaho Falls.
Design Report Small-Scale Fuel Alcohol Plant. Volume II. Detailed Construction Information
Dec 80, 313p
Contract AC07-76ID01570

Keywords: Biomass conversion plants, Construction, Design, Diagrams, *Alcohols, *Fuels, *Bioconversion, *Industrial plants, Distillation, Enzymatic hydrolysis, Equipment, Ethanol, Fermentation, Heat exchangers, Heat treatments, Idaho, Maize, Measuring instruments, Microprocessors, Process control, Production, Pumps, Specifications, Tanks, Valves.

The objectives of the report are to (a) provide potential alcohol producers with a reference design and (b) provide a complete, demonstrated design of a small-scale fuel alcohol plant. This report describes a small-scale fuel alcohol plant designed and constructed for the DOE by EG and G Idaho, Inc., an operating contractor at the Idaho National Engineering Laboratory. The plant is reasonably complete, having the capability for feedstock preparation, cooking, saccharification, fermentation, distillation, by-product dewatering, and process steam generation. An interesting feature is an instrumentation and control system designed to allow the plant to run 24 hours per day with only four hours of operator attention. Where possible, this document follows the design requirements established in the DOE publication Fuel From Farms, which was published in February 1980. For instance, critical requirements such as using corn as the primary feedstock, production of 25 gallons of 190 proof ethanol per hour, and using batch fermentation were taken from Fuel From Farms. One significant deviation is alcohol dehydration. Fuel From Farms recommends the use of a molecular sieve for dehydration, but a preliminary design raised significant questions about the cost effectiveness of this approach. A cost trade-off study is currently under way to establish the best alcohol dehydration method and will be the subject of a later report. Volume two includes equipment and instrumentation data sheets, instrument loop wiring diagrams, and vendor lists. (ERA citation 06:008763)

JPRS-43442 PC A02/MF A01
Joint Publications Research Service, Arlington, VA.
North Vietnam: Translations No. 288.
24 Nov 67, 22p

Keywords: *Agriculture, Vietnam, Water supplies, Tropical regions, Cereals, Production, Plants(Botany), Irrigation systems, Distribution(Economics).

Contents: Water conservancy to help make the winter-spring crop succeed; Ministry of Agriculture discusses measures to direct winter-spring crop; Rational irrigation for the fifth-month rice crop; Drought problems; Encouraging the large-scale production of organic fertilizer; Improving commodity distribution for peasants in Thai Binh Province; The need for increased production and supply of goods for feminine use; The need for families to plant medicinal plants.

JPRS-52169 PC A02 MF A01
Joint Publications Research Service, Arlington, VA.
Use of Krill for Food Protein.
N. I. Kryuchkova. 14 Jan 71, 7p
Trans. of Obtaining Food Protein from Krill, pub. in Rybnoe Khozyaistvo (USSR) v46 n11 p53-56 1970.

Keywords: Zooplankton, Food, *Proteins, Chitins, *Food processing, Meat, *USSR, Translations, *Krill.

Krill protein can be viewed as a highly valuable food product. The Okean protein paste obtained from krill in a frozen form can be used for preparing various dishes as well as in producing processed cheeses and other food products. The experiments conducted on sterilizing the protein paste and the freshly removed juice indicated that the sterilization temperature should not exceed 105C. At a temperature above 105C, the product turns dark and acquires an unpleasant aroma and taste. For food purposes it is possible to use freshcaught krill kept on the deck for not more than 4 hours. The krill which has been on the deck for more than 4 hours since catching should be used for producing feed meal. The coagulation of protein from the krill juice is possible following two variations. The first provides for protein coagulation in a heat exchanger and then the removal of the produced protein from the broth by filtering or centrifuging. In following the second variation, the coagulation of the protein from the krill juice occurs directly in the cans in sterilization. Here the broth is not removed, and in this regard the output of finished products increases. (Author)

JPRS-57636 PC A03/MF A01
Joint Publications Research Service, Arlington, Va.
Analysis of Virgin-Land Grain Raising
F. T. Morgun. 30 Nov 72, 41p
Trans of mono. from Dumy O Tseline, Moscow, 1969 p110-151.

Keywords: Grain crops, Land use, Agronomy, *USSR, Plant growth, Weeds, Wheat plants, Corn plants, Arid land, Translations, *Crops, Virgin land.

The report discusses the problems encountered in developing the virgin lands in the period 1958-1965. (Author)

JPRS-59968 PC A15/MF A01
Joint Publications Research Service, Arlington, Va.
Spring Wheat
P. K. Ivanov. 5 Sep 73, 334p
Trans. of mono. Yarovaya Pshenitsa, Moscow, 1971 328p.

Keywords: Wheat plants, *USSR, Classifications, Distribution(Property), Plant growth, Acclimatization, Plant nutrition, Cultivation, Plant genetics, Fertilizers, Seeds, Germination, Harvesting, Weed control, Irrigation, Plant diseases, Insect control, Handbooks, Translations, *Wheat, Spring wheat plants.

The report contains data on the national economic significance of spring wheat, its biological features, varieties and varietal zoning. A special section is devoted to methods of growing the wheat under irrigated conditions.

JPRS-63570 PC$4.75/MF$3.00
Joint Publications Research Service, Arlington, Va.
Ways for Reducing Grain Losses in Harvesting
A. F. Morozov, and A. N. Pugachev. 3 Dec 74, 90p
Trans. of mono. Snizheniya Poter Zerna pri Uborke Urozhaya, Moscow, 1973 p3-99, 319-320.

Keywords: *Grains(Food), Agronomy, *Agriculture, Harvesting, Translations, *USSR.

The report contains information on grain losses and harvesting methods and the organization of work.

JPRS-64642 PC A06/MF A01
Joint Publications Research Service, Arlington, Va.
Barley
A. Ya. Trofimovskaya. 28 Apr 75, 107p
Trans. of mono. Yachmen, Leningrad, 1973 p79-192.

Keywords: *Barley, Plant anatomy, Cell morphology, Chemical properties, Plant diseases, Cultivation, Photoperiodism, Translations, *USSR, *Grains(Food).

The report contains an analysis of the morphological-anatomical structure and agrobiological properties of barley as well as a description of selection methods.

JPRS-64646 PC A04/MF A01
Joint Publications Research Service, Arlington, Va.
Survey of Rice Growing
P. S. Erygina. 29 Apr 75, 64p
Trans. of mono. RIS, Moscow, 1970 p0063-0122, 0201-0215.

Keywords: Rice plants, Cultivation, Climate, Soils, Fertilizers, Precipitation(Meteorology), Agronomy, Translations, *USSR, *Rice.

The report contains a description of the agroclimatic conditions of rice-growing areas and of agricultural technology.

JPRS-65651 PC$4.25/MF$3.00
Joint Publications Research Service, Arlington, Va.
Growing Methods for Pea Crops
R. Kh. Makasheva. 11 Sep 75, 65p
Trans. of mono. Gorokh, Leningrad, 1973 p124-201.

Keywords: *Leguminous plants, Farm crops, Peas, Plant growth, Planting, Soil properties, Fertilization, Translations, USSR.

The report contains data on the growth of peas, including methods of planting, type of soil and fertilization procedures.

JPRS-71813 PC A04/MF A01
Joint Publications Research Service, Arlington, VA.
Essentials of Chemical Fertilizer Use in PRC
Wang Nai-ch'iang. 6 Sep 78, 72p

Keywords: *Fertilizers, Agricultural chemistry, *China, Nitrogen, Phosphorus, Potassium, Mixtures, Trace elements, History, Farm crops, Adsorption, Manufacturing, Transportation, Storage, Packaging.

This report contains a description of the characteristics and application methods of various nitrogen fertilizers, phosphorus fertilizers, potassium fertilizers, composite fertilizers, mixed fertilizers, trace element fertilizers, and other mineral fertilizers. In addition, the problems of packaging, transportation and storage are also described.

JPRS-72242 PC A14/MF A01
Joint Publications Research Service, Arlington, VA.
Handbook on Agricultural Techniques for State Farms
15 Nov 78, 323p

Keywords: *China, *Agriculture, Farm crops, *Seeds, Hybridization, *Agricultural machinery, Planting, Cultivation, Harvesting, Plant genetics, Farms, Handbooks, Translations.

This report contains information on Chinese agricultural techniques including seed propagation, crop rotation and cultivation and agricultural machinery.

LA-DC-13156 PC A02/MF A01
Los Alamos Scientific Lab., NM
Waste Management in a Small, Widely Dispersed Mountain Community
L. A. Emelity, R. Garde, and C. W. Christenson.
1971, 25p Rept no. CONF-720618-1
From 6. International Conference On Water Pollution Research- Jerusalem, Israel (18 Jun 1972).

Keywords: Los alamos area, *Waste disposal.

For abstract, see NSA 26 20, number 48486.

LA-UR-78-1571 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Simple Technique of Estimating the Performance of Passive Solar Heating Systems
J. D. Balcomb, and R. D. McFarland. 1978, 6p Rept no. CONF-780808-15
Contract W-7405-ENG-36
Meeting of the American Section of the International Solar Energy Society, Denver, CO, USA, 28 Aug 1978.

Keywords: Passive solar heating systems, Calculation methods, Performance, Sensible heat storage, Simulation, Thermal insulation, Trombe walls, Walls, Water, *Solar heating systems.

A method is presented for estimating the annual solar performance of a building using a passive thermal storage wall of the Trombe wall or water wall type with or without night insulation. Tables of performance parameters are given for 84 cities. The method is accurate to +-3% as compared with hour-by-hour computer simulations. (ERA citation 04:000454)

LA-UR-78-2589 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Solar Heating Results for the Nambe Community Center
H. S. Murray, J. C. Hedstrom, and J. D. Balcomb.
1978, 6p Rept no. CONF-781102-2
Contract W-7405-ENG-36

Solar heating and cooling systems operational results conference, Colorado Springs, CO, USA, 29 Nov 1978.

Keywords: *Buildings, Passive solar heating systems, Rock beds, *Solar heating systems, Cold storage, Control systems, Cooling, Design, Performance, Sensible heat storage, Solar air heaters, Solar collectors, Solar reflectors, Solar space heating, Thermal insulation, Thermal mass, Public buildings.

The Nambe Community Center is a solar heated adobe community building for the Nambe Indian Pueblo, located twenty miles north of Santa Fe, New Mexico. The 3000 ft exp 2 building makes use of several passive solar heating features. The active solar heating system is an air system using a 17 ton rock storage bed. The solar collector system consists of a 440 ft exp 2 vertical collector with a 1056 ft exp 2 reflector. The system also allows night evaporative cooling of the rock bed for summer cooling operation. The system became operational during the 1977--78 heating season, and solar heating data are presented for operation of the system in the spring of 1978. A discussion of using the rock bed for summer cold storage is also given. (ERA citation 04:022201)

LA-UR-78-774 PC A02/MF A01
Los Alamos Scientific Lab., NM.
State of the Art in Passive Solar Heating and Cooling
J. D. Balcomb. 1978, 9p Rept no. CONF-780337-5
Contract W-7405-ENG-36
National passive solar conference, Philadelphia, PA, USA, 15 Mar 1978.

Keywords: Passive solar cooling systems, Passive solar heating systems, *Buildings, Design, Research programs, Reviews, Technology assessment, *Solar heating systems, *Solar cooling systems.

Progress since the Albuquerque Passive Conference is discussed in terms of the major design approaches in buildings actually being constructed. Advantages and problem areas of each are described. Major areas where further work is needed are presented in detail. (ERA citation 03:052275)

LA-UR-78-929 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Solar Collectors for Cooling Applications
R. K. Collier. 1978, 10p Rept no. CONF-780249-4
Contract W-7405-ENG-26
Workshop on the use of solar energy for the cooling of buildings, San Francisco, CA, USA, 15 Feb 1978.

Keywords: *Solar collectors, *Solar cooling systems, Availability, Market, Performance, Research programs, Reviews.

Collector research projects funded by the R and D Branch for Heating and Cooling, Department of Energy, which have direct applicability as cooling machine prime movers, are described. Performance curves are given where they are available along with the development status and the market availability. (ERA citation 03:052305)

LA-6637-C PC A16
Los Alamos Scientific Lab., NM.
Passive Solar Heating and Cooling
M. H. Keller. 1976, 364p Rept no. CONF-760570-
Contract W-7405-ENG-36
Conference on passive solar heating and cooling, Albuquerque, New Mexico, United States of America (USA), 18 May 1976.

Keywords: Passive solar heating systems, *Solar cooling systems, Meetings, Leading abstract, *Solar heating systems.

Separate abstracts were prepared for each of the 45 included papers. (ERA citation 02:048011)

LA-6700-MS PC A04/MF A01
Los Alamos Scientific Lab., NM.
Long-Term Strategies for Supplying Nitrogen to Crops
V. P. Gutschick. May 77, 73p
Contract W-7405-ENG-36

Keywords: *Ammonia, *Crops, Plant growth regulators, Plants, Chemical preparation, *Nitrogen, Agriculture, Biosphere, Energy demand, *Fertilizers, Food, Fossil fuels, Human populations, Nitrogen cycle, Nutrients, Synthesis, Farm crops, Haber process.

Raising food for present population requires nitrogenous fertilizers in addition to indirect management of the biosphere's nitrogen cycle. The Haber process for making the ammonia base of fertilizers is increasingly pressed by shortages of energy, while only minor improvements are still possible. I discuss the Haber process and 15 alternatives for increasing the nitrogen available to crops using less fossil energy. These alternatives span technology of fertilizer synthesis, farm management and technology, crop genetics, and market management. They were selected by criteria of energy-efficiency and of meeting the numerous biological/physical constraints posed by soils and plants. The alternatives vary in scope and efficacy due to scientific, economic, and political constraints which need to be appreciated by policy-makers and researchers alike. I conclude that the Haber process will be the mainstay for nitrogen-nutrition of crops for 50 years, and a few alternative strategies will slowly achieve a partial replacement of the Haber process. Full replacement in the longer run requires commitment within a few decades to developing the strongest alternatives. (ERA citation 02:049987)

LBL-5927 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Ecological Considerations of the Solar Alternative
M. Davidson, D. Grether, and K. Wilcox. Feb 77, 48p
Contract W-7405-ENG-48

Keywords: Solar energy conversion, Wind power, *Environmental impacts, Agriculture, Biomass, Ecosystems, Environmental effects, Ocean thermal power plants, Process heat, Solar air conditioners, Solar cells, Solar heating systems, Biological energy conversion, Photovoltaic cells, Solar cells, *Solar energy, *Wind energy.

The main solar technologies are considered including solar thermal power, photovoltaic cells, ocean thermal power, wind energy, solar heating and cooling, bioconversion, and agricultural and process heat. The direct and indirect ecological and environmental impacts of these technologies are discussed. (ERA citation 02:040426)

LBL-6182 PC A04/MF A01
California Univ., Berkeley.
Feed and Food from Desert Environments
J. A. Bassham. Sep 77, 53p Rept no. CONF-770960-1
Contract W-7405-ENG-48
International workshop on bio-saline research, Kiawah Island, SC, USA, 17 Sep 1977.

Keywords: *Arid land, Farm crops, Hydrocarbons, Lubricating oils, *Proteins, *Agriculture, Carbohydrates, Biological adaptation, Biosynthesis, Climates, *Deserts, Irrigation, Nutrients, Plant breeding, Research programs, Socio-economic factors, Terrestrial ecosystems, Water supply, Biomass, Ecosystems, Energy sources, Lubricants, Organic compounds, Petroleum products, Renewable energy sources, *Lubrication, *Crops, *Plants(Botany), Jojoba oils, Euphorbic, *Jojoba, Prosopis juliflora.

Research programs on controlled environmental agricultural technology to allow a broad range of conventional and unconventional crops to be grown with very limited supplies of fresh or brackish water are reviewed. The use of water derived from the sea, from saline lakes, or from waste water treatment for crops in arid lands is discussed. Plant breeding programs to improve the nutritional value of food crops and irrigation systems to improve plant productivity are discussed. The production of liquid hydrocarbons and lubricating oils from plant species such as Euphorbic and Jojoba, and the use of leguminous plants such as mesquite (Prosopis juliflora), and other native plants, which thrive in arid regions, as important sources of proteins and carbohydrates are cited as examples of the productive potential of arid lands. 41 references. (ERA citation 03:015879)

LBL-7214 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Potential of Arid Zone Vegetation as a Source of Substrates
J. A. Bassham. Nov 77, 44p Rept no. CONF-771158-1
Contract W-7405-ENG-48
Seminar on microbial conversion systems for food and fodder production and water management, Kuwait City, Kuwait, 12 Nov 1977.

Keywords: *Agriculture, *Arid land, Plants, Biochemical reaction kinetics, Carbon dioxide, Controlled atmospheres, Cultivation techniques, Deserts, Efficiency, Energy sources, Food, Forecasting, Photosynthesis, Plant growth, Productivity, Reviews, Solar energy conversion, Biological energy conversion.

Three aspects of the potential of vegetation in arid zones as a source of substrates are discussed. The first includes the limitations on efficiency of conversion of solar energy to the stored chemical energy of biomass in green plants, and the subsequent biochemical pathways of carbon dioxide fixation and biosynthesis. Second is the potential of plants endogenous to arid zones. Finally, the use of covered agriculture or controlled environmental agriculture (CEA) is considered both in its present form and in terms of possible extension to the large scale production of stable crops. (ERA citation 03:030556)

LBL-7586 PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Green Factories for Liquid Fuel
G. J. Calvin, and M. Calvin. Apr 78, 20p
Contract W-7405-ENG-48

Keywords: Biomass, Synthetic fuels, Agriculture, Economics, Production, Rubber trees, Sugar cane, *Fuels, *Bioconversion, Plants(Botany), Hevea brasiliensis, Euphorbia tirucalli, Euphorbia lathyris, Trees(Plants).

Various plants that could be and are being used for the production of synthetic fuels are discussed. Among these are Hevea brasiliensis, Euphorbia tirucalli, and Euphorbia lathyris. Advantages of fuel production from renewable plant resources are presented; cost estimates are included. (ERA citation 03:047098)

LBL-7808 PC A05/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Urbanism and Energy in Developing Regions
R. L. Meier, S. Berman, and D. Dowell. 1 Mar 78, 100p
Contract W-7405-ENG-48

Keywords: Developed countries, Urban areas, Brazil, Comparative evaluations, Competition, Data compilation, Decision making, Demand factors, Developing countries, Education, Egyptian Arab Republic, Electric power, Employment, *Energy, Energy conservation, Energy consumption, Energy efficiency, Energy models, Energy policy, Energy shortages, Energy sources, Energy supplies, Failures, Food, Foreign policy, Global aspects, India, Mexico, Population dynamics, Quality control, Resource conservation, Resource depletion, South Vietnam, Technology transfer, Water resources, Egypt.

The pace of urbanization must continue, because in most parts of the world the surplus population in the countryside has nowhere else to go. The world is about 40% urban now and apparently headed for the 80 to 90% share of the total population presently exhibited by the developed countries. Thus, the 1.6 billion urban dwellers in 1978 would become about 3 billion in 1995--if major catastrophes can be avoided. Feasibility assessments for Sao Paulo-Rio de Janeiro, Calcutta, Cairo-Alexandria, Mexico City, and Seoul are presented in the appendices. This analysis-from-a-distance is insufficient to judge how much extra installed electrical generating capacity is required before 1995, the added refining capability for liquid fuels, or the uses for new LNG and coal imports due to be arranged. It is evident that energy (and perhaps also water in most regions) planning is the major determinant of the manner in which these urban areas will adapt to the extraordinary pressures for new settlement. The current round of planning in such metropolitan areas has been addressed to solving traffic-congestion problems, and reorganizing land use in central districts, as the most-pressing issues. Since energy sources and distribution systems now affect the largest and most crucial investments in urban growth it is to be expected that future metropolitan planning may concentrate upon energy efficiency. Energy supplies must be planned to meet requirements set by locally dominant values regarding human services and the environment. (ERA citation 03:050412)

LBL-8236 PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Petroleum Plantations
M. Calvin. Apr 78, 41p Rept no. CONF-7804110-1
Contract W-7405-ENG-48
Conference on the Agricultural Chemical Society, Nagoya, Japan, 1 Apr 1978.

Keywords: Biomass, Synthetic petroleum, *Alcohols, Arid lands, Carbon dioxide, Coal, Economic analysis, Energy substitution equivalent, Feasibility studies, Fermentation, Hydrocarbons, Photosynthesis, Plants, Resource potential, Trees, Yields, *Sugarcane, *Bioconversion, *Fuels, Chemical feedstock, Euphorbia bthyris, Plants(Botany), Solid wastes, Manufactured gas, Synthetic fuels.

Photosynthesis is examined as an annually renewable resource for material and energy. The production of fermentation alcohol from sugar cane as a major source of materials for chemical feed-stocks is examined as well as the direct photosynthetic production of hydrocarbon from known plant sources. Experiments are underway to analyze the hydrocarbons from Euphorbias and other hydrocarbon containing plants with a view toward determining their various chemical components. In addition, experimental plantings of several species of Euphorbias have begun to obtain data on which species would be most successful. Using Euphorbia lathyris, there are indications that we may expect a yield of approximately ten barrels of hydrocarbon material per acre in a seven-month growing period on semiarid land. (ERA citation 04:018339)

LBL-8296 PC A05/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Proceedings of the Hawaii Inventors' Conference
1978, 76p Rept no. CONF-780384-
Contract W-7405-ENG-48
Hawaii inventors conference, Iliki, HI, USA, 31 Mar 1978.

Keywords: *Technology transfer, Meetings, Hawaii, Appropriate technology, Energy supplies, Information, Patents, Research programs.

The First Hawaii Inventors' Conference was designed to satisfy specific objectives regarding the development, protection, and marketing of ideas and inventions. The program was designed to encourage inventors in Hawaii, stimulate more inventions to fruition, and add to the Hawaiian economy with knowledge gained from the papers presented. Papers presented and their authors are Reflections on the First Hawaii Inventors' Conference, Governor George R. Ariyoshi; Inventors' Guide to Creative Thinking, Norman C. Parrish; Two Ideas, Both Worth a Million Dollars, Robert G. Merrick; Department of Commerce/National Bureau of Standards Energy-Related Inventions Program, George P. Lewett; The National Technical Information Service, Peter F. Urbach; The Patent and Trademark Office Today, Lutrelle F. Parker; Technotec International Inventors' Registry, Walter H. Bruning; Appropriate Energy Technology, Joseph E. Machurek; The Process of Innovation for Financial Success, Phillip G. Larson; and Patents, Copyrights, and Trademarks, Murray K. Hatch. (ERA citation 04:041038)

LBL-9294 PC A02/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Passive Solar Design Process for a Small Office/Laboratory Building
B. Andersson, R. Kammerud, and W. Place. Oct 79, 15p Rept no. CONF-791009-26
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

Keywords: Commercial buildings, *Solar heating systems, Architecture, Design, *Buildings.

In order to assess the compatibility of existing passive solar design tools with the architectural process, a case study design for a small commercial building has been performed. The architectural process employed in the design is presented, the areas within the process for which appropriate tools are not immediately available are identified, and some improved tools are proposed. The potential advantages of passive solar design for a small commercial building in an adverse climate are demonstrated. (ERA citation 05:013357)

LBL-9391 PC A05/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Appropriate Energy Technology Library Bibliography
H. R. Clark. Aug 79, 87p
Contract W-7405-ENG-48

Keywords: Appropriate technology, Bibliographies, Libraries, *Energy.

Lawrence Berkeley Laboratory discovered the need for a library of books dealing with technologies on a smaller scale than that of customary laboratory projects. These books introduce researchers to the inventive and ecology-conscious thinking (in its various social and cultural milieus) that lies behind the drive for small-scale self-reliance. The introduction explains the philosophy behind the library, the browsing system of the library, and the makeup of the bibliography. The books included may be classified as follows: workshop books, city and village technologies, transport and military; energy in general, soft and hard; nuclear and fossils, the hard stuff; electricity; relatively unfamiliar cultures, population and food problems; ecology and economics, ocean ecology; history and philosophy, ideas and predictions; conservation and recycling; catalogs; alternative energy and appropriate technology, the soft stuff; solar techniques; design; passive and alternative energy houses; heat pumps and plumbing; codes and laws; construction, tools and materials; solar greenhouses; farming and simple living; food, agriculture and small gardens; land, its use and care; forestry and wood, wood stoves; other biomass; water power, pumps and wheels; wind; geothermal; atlases and references. (ERA citation 04:053260)

MIT-EL-78-006 PC A02/MF A01
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Micro Irrigation with Photovoltaics
D. V. Smith, and S. V. Allison. Apr 78, 22p
Contract EX-76-A-01-2295-037

Keywords: Developing countries, *Irrigation, *Solar water pumps, Capital, Economic analysis, Feasibility studies, Financing, Investment, Solar cell arrays, *Photovoltaic power system, *Water pumps.

One application of photovoltaics to irrigation water pumping is identified and analyzed: the case of the small farmer with 1-2 hectares of irrigable land and water available for pumping lift of under 5 meters. This application depends on resolution of the difficulty of financing capital investments for farmers currently operating at or below subsistence levels. (ERA citation 04:012809)

NCEI-0023 PC A03/MF A01
North Carolina State Univ. at Raleigh.
Utilization of Solar Energy in Grain Drying. Final Report, June 1978-June 1979
M. N. Ozisik, and B. K. Huang. Jul 79, 33p

Keywords: *Peanuts, Solar dryers, Data, Economics, Flow rate, Graphs, *Greenhouses, Humidity, Moisture, Parametric analysis, Performance testing, *Solar drying, Temperature monitoring.

Equipment was designed and constructed for use with an existing greenhouse solar drying system (solar barn) to study the utilization of solar energy for peanut curing under the conditions prevailing in North Carolina. The basic equipment consists of a rotary solar drum unit which holds about six tons of peanuts and a trailer unit which transport the drum and peanuts. The unique features of the prototype are that the perforated sheet metal surfaces and the dryer unit itself serves partly as a solar heat absorber/collector during drying mode operation and that the circumferential surface of the rotary drum unit can be disassembled and hung on the drum frame to serve as a ferris wheel plant production system during greenhouse mode operation. The design will provide multi-purpose utilization of the facilities enhancing the economic feasibility of the system. Four full-scale tests were performed for peanut drying using both solar and furnace heating. No-load tests were also performed for system performance study. Computer simulation programs were developed to correlate the measured data and the mathematical model prediction. The heat and mass transfer analysis of solar air heating and grain drying for the prototype model is described and the results of a parameter survey showing the effects of various system parameters on drying time are presented. (ERA citation 06:004686)

NP-21727 PC A09/MF A01
Minnesota Univ., Minneapolis.
Methanol: Its Synthesis, Use as a Fuel, Economics, and Hazards
D. L. Hagen. Dec 76, 166p
Thesis.

Keywords: *Alcohols, Alcohol fuel cells, *Automotive fuels, *Bioconversion, Boiler fuel, Diesel engines, *Methanol, Otto cycle, Turbines, Bibliographies, Biological effects, Biomass, Biosynthesis, Boilers, Carbon dioxide, Carbonates, Chemical preparation, Combustion products, Economics, Environmental effects, Fermentation, Food, Fossil fuels, Fuels, Hazards, Performance testing, Production, Reviews, Safety, Synthesis, Technology assessment, Uses, *Fuels.

The synthesis of methanol using existing and proposed means of production and sources of feedstocks is reviewed. Conventional methods of producing methanol are surveyed. Proposed methods of fermentation, electro-, and radiation-synthesis are discussed. Conventional production technology from synthesis gas is examined in detail. The range of possible sources of feedstocks from fossil fuels to biomass, atmospheric carbon dioxide, and carbonates are portrayed along with renewable and nonrenewable energy sources. A survey of recent studies and research on methanol is given within the historical context. Fuel related properties are reviewed and compared with isooctane. Combustion emissions and their variation with temperature and fuel preparation are similarly compared. Uses of methanol as a combustion fuel and recent tests in boilers, turbines, conventional and stratified charge Otto engines, and diesel engines are discussed emphasizing comparative efficiencies. Current developments on the uses of methanol directly and indirectly in fuel cells and as a feedstock for single cell protein are examined. Historical prices of methanol are presented along with major causes for the fluctuations. The costs of synthesizing methanol are presented including overall production costs from organic feedstocks. Proposed costs of producing methanol from electrolytic hydrogen and carbon dioxide are also given. Fiscal and physical causes for inflation are discussed along with the costs of storage, transportation and conversion. The numerous biological, physical, and chemical hazards of using methanol as a fuel are discussed together with safety precautions and treatment. 809 references. (ERA citation 02:040420)

NSF-RA-N-75-051 PC A05/MF A01
MITRE Corp., McLean, VA.
Wind Machines
F. R. Eldridge. Oct 75, 84p

Keywords: Wind power, Wind power plants, *Turbines, *United States, Design, Economics, *Electric power, Power generation, *Wind energy, Site selection, Performance, Windmills, Cost estimates.

A brief survey is presented of the present status of the viability, history, taxonomy, and future potential of various types and sizes of wind machines that might be used to help meet future U. S. energy demands. The document also discusses various possible applications of wind machines, as well as siting problems, performance characteristics, and system designs for such machines. A glossary of commonly used words and phrases is appended to this report. All costs and prices are given in terms of 1975 dollars, unless otherwise stated. (ERA citation 01:023149)

N68-20393/4 PC A06/MF A01
Universidad Autonoma de San Luis Potosi (Mexico). Escuela de Ingenieria.
Stabilization of Sub-Base and Base Materials for Pavement.
Estabilization de Materiales Para Sub-base Y Base de Pavimentacion
J. F. Sandoval. 1967, 121p
Text in Spanish

Keywords: *Asphalt, Calcium oxides, Cements, *Pavements, Stabilization, Foundations, Hydrates, *Roads, Substrates, *Soil stabilization.

For abstract, see STAR 0610

N72-18152/2 PC A05/MF A01
Comision Nacional de Investigaciones Espaciales, Buenos Aires (argentina).
Educational Television Via Satellite. Preliminary Studies and Plans, Volume 2. Television Educativa Via Satelite. Estudios de Antecedentes Y Proyecto Preliminar de Plan, Tomo 2
1970, 85p
Text in Spanish.

Keywords: Artificial satellites, *Education, South America, *Television, Argentina, Law (jurisprudence), Populations.

A preliminary design for a national and regional education system utilizing satellite television is considered for Argentina and other South American countries, taking special zonal factors into account. International aspects of educational TV and legal precedents are considered. Population distribution and educational statistics are also presented.

N72-28508/3 PC A02/MF A01
Scientific Translation Service, Santa Barbara, Calif.
Problems in the Construction of Woodworking Machines
W. Schmutzler. Jul 72, 24p Rept no. NASA-TT-F-14398
Contract NASW-2035
Tran- Transl. Into English From Holz Roh. Werkstoff (Berlin), V. 26, No. 7, Jul. 1968 P 237-243

Keywords: *Machine tools, Roller bearings, Shafts (machine elements), Wood, Loads (forces), Lubrication, Noise reduction, Spindles, *Woodworking.

For the construction of modern wood working machines, problems such as the most favorable tool spindle and shaft bearings play an important part. The construction and functional details of these machines are considered. The interrelationships are discussed of speed, bearing load, fit and lubrication, as well as bearing devices and their installation. The particulars of motor shaft bearings are considered along with questions concerning oscillating shafts. Another, equally important construction detail is the chip suction system. Defects that might occur in the construction of suction hoods or at the machines themselves are described. Finally, questions of noise abatement, its cause and elimination are discussed. (Author)

N73-33460/9 PC E11/MF A01
New Mexico Univ., Albuquerque. Technology Application Center.
Proceedings of Symposium on Utilization of Waste Glass in Secondary Products
25 Jan 73, 365p Rept no. NASA-CR-135792
Subm-Sponsored by NASA. Conf-Conf. Held at Albuquerque, N. Mex., 24-25 Jan. 1973; Sponsored by N. Mex. Univ., Glass Container Manufacturers Inst., Inc., and Albuquerque Dept. Of Environ. Health.

Keywords: Conferences, *Glass, Waste utilization, Asphalt, Cements, Composite materials, Concretes, Glass fibers, Pavements, *Waste recycling.

Papers are reported which were presented at the conference on waste glass recovery and re-use in secondary products. The uses considered include: road surfacing, asphaltic concretes, road construction, terrazzo, cement concrete, pozzolan, glass wool, glass-polymer composites, and tiles. Problems of recycling glass in remote areas, and the economics and markets for secondary glass products are discussed.

N74-15752/0 PC A02/MF A01
Kanner (Leo) Associates, Redwood City, Calif.
Utilization of Wind Power in Agriculture in the USSR
D. Stein. Feb 74, 13p Rept no. NASA-TT-F-15345
Contract NASW-2481
Tran-Transl. Into English from Elektrizitaetswirtschaft (West Germany), V. 40, No. 4, 5 Feb. 1941 p 54-56.

Keywords: *Agriculture, Windpower utilization, *Wind energy.

Wind motors are being used in Russian agriculture for milling and pumping water. Plans call for rapid expansion of the utilization of such power plants. The extent of present utilization, problems, and forecasts are outlined. (Author)

N74-16801/4 PC A02/MF A01
Linguistic Systems, Inc., Cambridge, Mass.
Using the Energy of the Wind for Electrification
V. R. Sektorov. Feb 74, 18p Rept no. NASA-TT-F-15307
Contract NASW-2482
Tran-Transl. Into English from Elektrichestvo, (Ussr), No. 3 March 1953 p 11-16.

Keywords: *Agriculture, Electric power supplies, Windpowered generators, Electric power plants, Flywheels, Rural areas, Windpower utilization, *Wind energy, *Electric power.

The utilization of wind energy for generating electric power is discussed. Existing power generators utilizing wind energy are described and their use in agriculture is indicated. (Author)

N75-16128/1 PC E99/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths for Removal of Phenols from Polluted Waters.
B. C. Wolverton. 5 Feb 75, 18 Rept no. NASA-TM-X-72722

Keywords: *Phenols, Plants (Botany), *Water pollution, Bayous, Ecology, Environmental monitoring, Evapotranspiration, Gas chromatography, Hydroponics, Plant roots, *Aquatic weeds, *Water hyacinth.

Removal of phenol by water hyacinths (Eichhornia crassipes (Mart.) Solms) in static water was investigated. 2.75 g dry weight of this aquatic plant demonstrated the ability to absorb 100 mg of phenol per plant per 72 hours from distilled water, river water, and bayou water. One hectare of water hyacinth plants is shown to be potentially capable of removing 160 kg of phenol per 72 hours from waters polluted with this chemical. (Author)

N75-16129/9 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths for Removal of Cadmium and Nickel from Polluted Waters.
B. C. Wolverton. 5 Feb 75, 11p Rept no. NASA-TM-X-72721

Keywords: *Cadmium, *Nickel, Plant roots, *Water pollution, Aqueous solutions, Material absorption, Pollution control, Trace contaminants, *Water hyacinth, *Aquatic weeds.

Removal of cadmium and nickel from static water systems utilizing water hyacinths (Eichhornia crassipes (Mart.) Solms) was investigated. This aquatic plant demonstrated the ability to rapidly remove heavy metals from aqueous systems by root absorption and concentration. Water hyacinths demonstrated the ability to absorb and concentrate up to 0.67 mg of cadmium and 0.50 mg of nickel per gram of dry plant material when exposed for a 24-hour period to waters polluted with from 0.578 to 2.00 ppm of these toxic metals. It is found that one hectare of water hyacinths has the potential of removing 300 g of cadmium or nickel from 240,000 liters of water polluted with these metals during a 24-hour period. (Author)

N75-16206/5 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Aquatic Plants for Removal of Mevinphos from the Aquatic Environment.
B. C. Wolverton. Feb 75, 8p Rept no. NASA-TM-X-72720

Keywords: *Pesticides, Plants (Botany), *Water pollution, Bioassay, Biological effects, Ecology, Environmental monitoring, Fishes, Grasses, Plant roots.

Fragrant waterlily (Nymphaea odorata, Ait.), joint-grass (Paspalum distichum L.), and rush (Juncus repens, Michx.) were used to evaluate the effectiveness of vascular aquatic plants in removing the insecticide mevinphos (dimethyl-1-carbomethoxy-1propen-2-yl phosphate) from waters contaminated with this chemical. The emersed aquatic plants fragrant waterlily and joint-grass removed 87 and 93 ppm of mevinphos from water test systems in less than 2 weeks without apparent damage to the plants; whereas rush, a submersed plant, removed less insecticide than the water-soil controls. Water-soil control still contained toxic levels of this insecticide, as demonstrated by fish bioassay studies, after 35 days. (Author)

N75-17045/6 PC A06/MF A01
World Meteorological Organization, Geneva (Switzerland).
A Survey of Meteorological and Hydrological Data Available in Six Sahelian Countries of West Africa. A Survey of Studies in Meteorology and Hydrology in the Sudano-Sahelian Zone of West Africa.
E. G. Davy. 1974, 125p Rept no. WMO-379
Partly in English and Partly in French.

Keywords: Africa, *Agriculture, *Drought, Economic development, Meteorological services, Precipitation (Meteorology), Chad, Hydrometeorology, Mali, Mauritania, Niger, Rain, Senegal, Upper volta, Weather stations, *Hydrology, *Meteorology.

A meteorological and hydrological survey was made in six West African countries, namely, Upper Sahel, Upper Volta, Mali, Mauritania, Niger, Senegal, and Chad. The survey was carried out in conjunction with an economic development program particularly oriented to the severe drought problem of the Sahelan regions. Urgent investigation is needed in four areas: weather/crop correlations, weather/run-off correlations and maps of agricultural and water resources potential, periodic recurrence and persistence of rainfall, and droughts in relation to general atmospheric circulation. A list of stations and their services is included.

N75-17786/5 PC A03/MF A01
Kanner (Leo) Associates, Redwood City, Calif.
Wind Power Machines.
U. Hutter. Feb 75, 26p Rept no. NASA-TT-F-16195
Contract NASW-2481
Tran-Transl. Into English from the Book "Huette, des Ingenieurs Taschenbuch" Berlin, Wilhelm Ernst and Son, 1954 p 1030-1044.

Keywords: Wheels, Windmills (Windpowered machines), Aerodynamic characteristics, Windpower utilization, *Wind energy.

Basic aerodynamic features of wind power and wind wheels are discussed. The adaptation of wind power to running machinery is described. Developments in wind power are illustrated, followed by a brief outline of operating properties. (Author)

N75-19821/8 PC 12/MF A01
Kanner (Leo) Associates, Redwood City, Calif.
Wind Motors: Theory, Construction, Assembly and Use in Drawing Water and Generating Electricity.
R. Champly. Apr 75, 253p Rept no. NASA-TT-F-16201
Contract NASW-2481
Tran-Transl. Into English from the Book "Theorie, Construction, Montage, Utilisation au Puisage de l'Eau a la Production de l'Electricite" Paris, Dunod Publ., 1973 270 p.

Keywords: Windmills, Windpowered generators, Windpowered pumps, Electricity, Energy conversion, Windpower utilization, *Water pumps, *Wind energy, *Turbines.

A brief history of windmills is given. Various models are described, with discussions of their pros and cons, especially in regard to number of blades and method of orientation to the wind. Systems for transmission of power from the wind motor to a pump, generator, or other type of equipment are described. A method for computing the tension and compression stresses on the wind motor pylon is given and the construction of pylons and water tanks is discussed. Foundation and anchoring systems are described, as are several methods for assembling and raising the wind motor on its pylon. Systems using wind motors to draw and elevate water by means of pumps and systems using wind motors in conjunction with generators, storage batteries, etc., to generate electricity are described. Efficiency tables and comparative cost price tables are provided for each of these applications. (Author)

N75-22937/7 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.

Water Hyacinths and Alligator Weeds for Removal of Lead and Mercury from Polluted Waters.
B. C. Wolverton, and R. C. Mcdonald. 11 Apr 75, 14p
Rept no. NASA-TM-X-72723

Keywords: *Lead (Metal), *Mercury, Pollution control, Vegetation growth, *Water pollution, Absorptivity, Machining, Tables (Data), Toxicity, *Aquatic weeds, *Alligator weed, *Water hyacinth.

Removal of lead and mercury by water hyacinths (Eichhornia crassipes) (Mart.) Solms and alligator weeds (Alternanthera philoxeroides) (Mart.) Griesb. was investigated. Water hyacinths demonstrated the ability to remove 0.176 mg of lead and 0.150 mg of mercury per gram of dry plant material from distilled water and river water in a 24-hour period. One acre of water hyacinths is potentially capable of removing 105.6 grams of lead and 90.0 grams of mercury per day. Alligator weeds removed 0.101 mg of lead per gram of dry plant material in a 24-hour period. This same plant also demonstrated the ability to remove a minimum of 0.153 mg of mercury per gram of dry plant material in a six hour period. (Author)

N75-24163/8 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths and Alligator Weeds for Removal of Silver, Cobalt, and Strontium from Polluted Waters.
B. C. Wolverton, and R. C. Mcdonald. May 75, 14p
Rept no. NASA-TM-X-72727

Keywords: *Cobalt, *Silver, *Strontium, *Water pollution, Carcinogens, Heart diseases, Plant roots, Radioactive wastes, Trace contaminants, Water treatment, *Aquatic weeds, *Water hyacinth, *Alligator weed.

Water hyacinths and alligator weeds demonstrated the ability to rapidly remove heavy metals from an aqueous system by root absorption and concentration. Water hyacinths demonstrated the ability to remove 0.439 mg of silver, 0.568 mg of cobalt, and 0.544 mg of strontium in an ionized form per gram of dry plant material in a 24-hour period. Alligator weeds removed a maximum of 0.439 mg of silver, 0.130 mg of cobalt, and 0.161 mg of strontium per gram of dry plant material per day. (Author)

N75-27564/4 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Bio-Conversion of Water Hyacinths into Methane Gas, Part 1.
B. C. Wolverton, R. C. Mcdonald, and J. Gordon. Jul 74, 13p Rept no. NASA-TM-X-72725

Keywords: Plants (Botany), Synthane, Cadmium, Fermentation, Nickel, Pollution control, *Water hyacinth, *Methane, *Bioconversion, *Aquatic weeds.

Bio-gas and methane production from the microbial anaerobic decomposition of water hyacinths (Eichhornia crassipes) (Mart) Solms was investigated. These experiments demonstrated the ability of water hyacinths to produce an average of 13.9 ml of methane gas per gram of wet plant weight. This study revealed that sample preparation had no significant effect on bio-gas and/or methane production. Pollution of water hyacinths by two toxic heavy materials, nickel and cadmium, increased the rate of methane production from 51.8 ml/day for non-contaminated plants incubated at 36 C to 81.0 ml/day for Ni-Cd contaminated plants incubated at the same temperature. The methane content of bio-gas evolved from the anaerobic decomposition of Ni-Cd contaminated plants was 91.1 percent as compared to 69.2 percent methane content of bio-gas collected from the fermentation of non-contaminated plants. (Author)

N75-27567/7 PC A03/MF A01
Hampton Inst., Va. Dept. of Agriculture.
Space and Energy Conservation Housing Prototype Unit Development.
Final Report, Apr. - Aug. 1975.
D. R. Sunshine. Aug 75, 50p Rept no. NASA-CR-143201
Grant NSG-1182

Keywords: Architecture, *Energy conservation, Prototypes, *Buildings, Construction, Construction materials, Energy policy, Solar energy, Urban development.

Construction plans are discussed for a house which will demonstrate the application of advanced technology to minimize energy requirements and to help direct further development in home construction by defining the interaction of integrated energy and water systems with building configuration and construction materials. Housing unit designs are provided and procedures for the analysis of a variety of housing strategies are developed. (Author)

N75-32591/0 PC A04/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Flat-Plate Solar-Collector Performance Evaluation with a Solar Simulator as a Basis for Collector Selection and Performance Prediction.
F. F. Simon. 1975, 52p Rept nos. NASA-TM-X-71793, E-8470
Conf-Presented at 1975 Intern. Solar Energy Soc. Meeting, Los Angeles, 28 Jul. - 8 Aug. 1975.

Keywords: Flat plates, Performance prediction, *Solar collectors, Solar simulators, Air conditioning, Cost effectiveness, Performance tests, Solar energy conversion, Sunlight, Tables (Data).

The use of a solar simulator for performance determination permits collector testing under standard conditions of wind, ambient temperature, flow rate and sun. The performance results determined with the simulator have been found to be in good agreement with outdoor performance results. The measured thermal efficiency and evaluation of 23 collectors are reported which differ according to absorber material (copper, aluminum, steel), absorber coating (nonselective black paint, selective copper oxide, selective black nickel, selective black chrome), type of glazing material (glass, Tedlar, Lexan, antireflection glass), the use of honeycomb material and the use of vacuum to pervent thermal convection losses. The collectors were given performance rankings based on noon-hour solar conditions and all-day solar conditions. The determination with the simulator of an all-day collector performance was made possible by tests at different incident angles. The solar performance rankings were made based on whether the collector is to be used for pool heating, hot water, absorption air conditioning, heating, or for a solar Rankine machine. (Author)

N76-10569/1 PC A07/MF A01
Ohio Agricultural Research and Development Center, Wooster.
Grown Organic Matter as a Fuel Raw Material Resource.
Final Report.
W. L. Roller, H. M. Keener, R. D. Kline, H. J. Mederski, and R. B. Curry. Oct 75, 134p Rept no. NASA-CR-2608
Contract NGL-36-007-001

Keywords: Agriculture, Crop growth, Earth resources, *Fuels, Organic materials, Cellulose, Cost analysis, Fibers, Food, Photosynthesis, Production management, Solar energy, *Bioconversion.

An extensive search was made on biomass production from the standpoint of climatic zones, water, nutrients, costs and energy requirements for many species. No exotic species were uncovered that gave hope for a bonanza of biomass production under culture, location, and management markedly different from those of existing agricultural concepts. A simulation analysis of biomass production was carried out for six species using conventional production methods, including their production costs and energy requirements. These estimates were compared with data on food, fiber, and feed production. The alternative possibility of using residues from food, feed, or lumber was evaluated. It was concluded that great doubt must be cast on the feasibility of producing grown organic matter for fuel, in competition with food, feed, or fiber. The feasibility of collecting residues may be nearer, but the competition for the residues for return to the soil or cellulosic production is formidable. (Author)

N76-10697/0 PC A02/MF A01
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths for Upgrading Sewage Lagoons to Meet Advanced Wastewater Treatment Standards, Part 1.
B. C. Wolverton, and R. C. Mcdonald. Oct 75, 9p
Rept no. NASA-TM-X-72729

Keywords: Filtration, Plants (Botany), Sewage, *Water treatment, Biochemistry, Chemical analysis, Pollution control, *Water hyacinth, *Sewage treatment, *Aquatic weeds.

Water hyacinths, Eichhornia crassipes Mart. Solms, have demonstrated the ability to function as an efficient and inexpensive final filtration system in a secondary domestic sewage lagoon during a three month test period. These plants reduced the suspended solids, biochemical oxygen demanding substances, and other chemical parameters to levels below the standards set by the state pollution control agency. The water hyacinth-covered secondary lagoon utilized in this experiment had a surface area of 0.28 hectare (0.70 acre) with a total capacity of 6.8 million liters (1.5 million gallons), receiving an inflow of 522,100 liters (115,000 gallons) per day from a 1.1 hectare (3.8 acre) aerated primary sewage lagoon. These conditions allowed a retention time of 14 to 21 days depending on the water hyacinth evapotranspiration rates. The desired purity of final sewage effluent can be controlled by the water hyacinth surface area, harvest rate, and the retention time. (Author)

N76-20489/0 PC A03/MF A01
National Aeronautics and Space Administration, Washington, D.C.
Hand and Power Tools: A Compilation.
Technology Utilization.
Jan 76, 29p Rept no. NASA-SP-5976(06)

Keywords: Portable equipment, Tools, Descriptions, *Industrial plants, Maintenance, Metal working, Shops, Technology utilization, *Hand tools.

Some hand and power tools were described. Section One describes several tools and shop techniques that may be useful in the home or commercial shop. Section Two contains descriptions of tools that are particularly applicable to industrial work, and in Section Three a number of metal working tools are presented. (Author)

N76-27671/6 PC A04/MF A01
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
An Inexpensive Economical Solar Heating System for Homes.
J. W. Allred, J. M. Shinn, Jr, C. E. Kirby, and S. R. Barringer. Jul 76, 59p Rept nos. NASA-TM-X-3294, L-10451

Keywords: Solar heating, Residential areas, Construction materials, Heat exchangers, Installing, Low cost, Pipes (Tubes), Solar collectors, Storage tanks, *Solar heating systems, *Buildings, Solar space heating, Residential buildings, Instructions.

A low-cost solar home heating system to supplement existing warm-air heating systems is described. The report is written in three parts: (1) a brief background on solar heating, (2) experience with a demonstration system, and (3) information for the homeowner who wishes to construct such a system. Instructions are given for a solar heating installation in which the homeowner supplies all labor necessary to install off-the-shelf components estimated to cost $2,000. These components, which include solar collector, heat exchanger, water pump, storage tank, piping, and controls to make the system completely automatic, are available at local lumber yards, hardware stores, and plumbing supply stores, and are relatively simple to install. Manufacturers and prices of each component used and a rough cost analysis based on these prices are included. This report also gives performance data obtained from a demonstration system which was built and tested at the Langley Research Center. (Author)

N76-71498/9 PC A05/MF A01
Comptroller General of the United States, Washington, D.C. Resources and Economic Development Div.
Using Solid Waste to Conserve Resources and to Create Energy. Environmental Protection Agency. Report to the Congress
27 Feb 75, 79p Rept no. RED-76-326, B-166506

Keywords: Solid waste disposal, Materials recovery, *Fuels, Management planning, Government policies, Reclamation, Regulations, Refuse disposal, Separation, Waste processing, Economic analysis, Metal

scrap, Incinerators, Research management, *Waste recycling, Oil wastes, Pyrolysis incineration.

Contents: Resource recovery: What it is and why it is important; Progress in implementing provisions of the resource recovery act has been slow; Major issues confronting resource recovery, recycling, and reuse; Energy recovery from solid waste; The Federal roll in assisting States and Localities in establishing resource recovery programs; Scope of review. Portions of this document are not fully legible.

N77-19729/1 PC A02/MF A01
Alcorn State Univ., Lorman, Miss. Dept. of Biological Sciences.
Bio-Gas Production from Alligator Weeds.
Semiannual Report.
A. Latif. 1 Jun 76, 11p Rept no. NASA-CR-149809
Grant NSG-8036

Keywords: Biodegradation, Fermentation, *Methane, Plants (Botany), Anaerobes, Bacteria, Luminous intensity, Metabolic wastes, pH, Temperature effects, *Aquatic weeds, *Bioconversion, Reducing agents, Aquatic weeds, *Alligator weed, Alternanthera philoxeroides.

Laboratory experiments were conducted to study the effect of temperature, sample preparation, reducing agents, light intensity and pH of the media, on bio-gas and methane production from the microbial anaerobic decomposition of alligator weeds (Alternanthera philoxeroides. Efforts were also made for the isolation and characterization of the methanogenic bacteria.

N77-32589/2 PC A03
Laboratoires d'Electronique et de Physique Appliquee, Paris Limeil-Brevannes (France).
Mise en Place a Dakar d'Une Pompe Alimentee Par des Panneux de Cellules Solaires (Installation in Dakar of a Pump Powered by Solar Cell Panels).
Final Report.
C. J. Naaijer. Jun 76, 44p
Contract DGRST-75-7-1302
Text in French.

Keywords: Hydraulic equipment, Pumps, Energy conversion efficiency, Solar cells, Automation, Constraints, Optimization, Photovoltaic cells, *Photovoltaic power system, *Water pumps, *Solar water pumps.

The installation of a solar-powered water pumping system in Dakar (Franch Sahara) is described. The interrelation of the various constraints is detailed together with the reasons for choosing photovoltaic cells. The solar collector pump, engine, buffer battery, and control unit are discussed. The functional characteristics for the automation of the system is elaborated upon.

N77-33663/2 PC A04/MF A01
Battelle Columbus Labs., Ohio.
Review of Current Interest and Research in Water Hyacinth-Based Wastewater Treatment.
Final Report.
R. K. Markarian, J. E. Balon, and A. C. Robinson.
Feb 77, 59p Rept nos. NASA-CR-155150, BCL-OA-TFR-77-1
Contract NASW-2800

Keywords: *Sewage treatment, *Water pollution, Aquaculture, Industrial wastes, Solid wastes, *Water treatment, *Aquatic weeds, Interviews, *Water hyacinth.

The status of activity in the user community for water hyacinth-based wastewater treatment was evaluated. The principal technique used was that of interviewing people who either (1) were known to be engaged in hyacinth research or development or (2) had made inquiry to NASA about hyacinth systems. About 40 non-research organizations and a similar number of research organizations were contacted. As a result of the interviews and a review of the relevant literature, it was concluded that hyacinth systems have the potential for providing a lower cost way for small cities to meet increasingly stringent effluent requirements. A limited amount of full-scale demonstration of hyacinth systems has been carried out during the past two years, but the yield of design data has been small. Several organizations are currently planning construction of experimental full-scale hyacinth-based wastewater treatment systems during 1977-1978.

N78-11653/0 PC A07/MF A01
World Meteorological Organization, Geneva (Switzerland).
Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas.
1977, 135p
Subm-Prepared Jointly with Econ. And Social Comm. For Asia and the Pacific and League of Red Cross Soc.

Keywords: *Cyclones, Weather forecasting, Preparation, Prevention, Disasters, *Floods, Land use, Storm damage, Tropical storms, Warning systems, *Meteorology, *Wind pressure, Switzerland.

Following a general introduction and background information, forecasts and warnings of tropical cyclones, river floods, and storm surges are reviewed. The role of disaster prevention in national planning is discussed together with legislation for disaster prevention, risk evaluation, land use, and zoning and building codes. Planning and legislation for disaster preparedness are summarized along with aspects such as tropical cyclone warning systems, flood fighting, evacuation of danger areas, public education and information, and test exercises and emergency operations. Finally, disaster rehabilitation and resettlement and assessment of damage are discussed.

N78-17466/1 PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH., Lewis Research Center.
Wind Turbine Generator Rotor Blade Concepts with Low Cost Potential.
T. L. Sullivan, T. P. Cahill, D. G. Griffee, Jr, and H. W. Gewehr. Dec 77, 38p Rept nos. NASA-TM-73835, DOE/NASA-1028-77/13
Contract E(49-26)-1028
Conf-to Be Presented at the 23rd Natl. Symp., Anaheim, Calif., 2-4 May 1978.

Keywords: Rotor blades (Turbomachinery), Turbine blades, Low cost, Product development, Turbogenerators, Windpowered generators, *Turbines, *Wind energy, Wind turbines.

Four processed for producing blades are examined. Two use filament winding techniques and two involve filling a mold or form to produce all or part of a blade. The processes are described and a comparison is made of cost, material properties, design and free vibration characteristics. Conclusions are made regarding the feasibility of each process to produce low cost, structurally adequate blades.

N78-19616/9 PC A13/MF A01
National Aeronautics and Space Administration, Cleveland, OH., Lewis Research Center.
Wind Turbine Structural Dynamics.
D. R. Miller. 1978, 280p Rept nos. NASA-CP-2034, DOE-CONF-771148
Conf-Workshop Held at Cleveland. 15-17 Nov. 1977; Sponsored by DOE.

Keywords: Mechanical drives, *Turbines, Windpowered generators, Dynamic loads, Dynamic structural analysis, Energy conversion, Low cost, Stability derivatives, Vibrational stress, Windpower utilization, *Wind energy, Wind turbines.

For abstract, see STAR 1610

N78-20595/2 PC A07/MF A01
World Meteorological Organization, Geneva (Switzerland).
Casebook of Examples of Organization and Operation of Hydrological Services.
1977, 143p Rept nos. WMO-481, OHR-9

Keywords: *Hydrology, *Water management, *Water resources, Economic factors, Problem solving, Services.

Contributions from twelve countries on solutions to institutional and organizational problems encountered by them in setting up their hydrological services are presented. The countries are representative of services operating under various climatic, physiographic, and economic conditions. Each contribution covers six sections: introduction; role and goals of water in the national economy; water resources management; the hydrological service; effectiveness of the service; and future plans.

N78-24698/0 PC A04/MF A01
United Nations Educational, Scientific and Cultural Organization, Paris (France).
Regional Meeting of Experts on Environmental Education in Asia.
International Environmental Education Programme - UNESCO-UNEP. Final Report.
10 Feb 77, 73p Rept no. UNESCO-ED-77/WS/22
Conf-Conf. Held at Bangkok, 15-20 Nov. 1976.

Keywords: Asia, Earth environment, Education, Ecology, Economic factors, *Environmental management, Environment protection, Qualifications, Social factors, United Nations, Universities.

Following a description of the environmental situation in Asia, the need and basis for environmental education is discussed. Problems and activities in environmental education in Asia are reviewed and features for improving it are presented.

N78-24699/8 PC A04/MF A01
United Nations Educational, Scientific and Cultural Organization, Paris (France).
Regional Meeting of Experts on Environmental Education in Latin America and the Caribbean.
International Environmental Education Programme - UNESCO-UNEP Final Report.
1 Mar 77, 57p
Subm-Sponsored by Konrad Adenauer Found. Conf-Conf. Held at Bogota, 24-30 Nov. 1976.

Keywords: Earth environment, Education, South America, Caribbean Sea, Ecology, Economic factors, *Environmental management, Environment protection, Qualifications, Social factors, United Nations, Universities, Caribbean Sea Islands, Meetings.

The background and objectives of the meeting are outlined followed by discussions on environmental education in the context of ecodevelopment and life-long education in Latin America. The present state of environmental education and the educational systems in Latin America are reviewed and strategies to introduce and develop environmental education at regional and national levels in Latin America are presented.

N78-25012/3 PC A03/MF A01
National Aeronautics and Space Administration, Washington, DC.
Waste Heat Utilization in Industrial Processes.
M. Weichsel, and W. Heitmann. Apr 78, 35p Rept no. NASA-TM-75210
Contract NASW-2791

Keywords: Cooling systems, Heat exchangers, Heat pumps, Economic development, Industrial plants, Waste energy utilization, *Process heat, Translations, *Waste heat utilization, West Germany.

A survey is given of new developments in heat exchangers and heat pumps. With respect to practical applications, internal criteria for plant operation are discussed. Possibilities of government support are pointed out. Waste heat steam generators and waste heat aggregates for hot water generation or in some cases for steam superheating are used. The possibilities of utilization can be classified according to the economic improvements and according to their process applications, for example, gas cooling. Examples are presented for a large varioty of applications.

N78-25998/3 PC A02/MF A01
National Inst. for Water Research, Pretoria (South Africa).
Comparative Reclamation of Potable Water from Biofilter and Activated Sludge Effluents at the Stander Water Reclamation Plant.
S. H. V. Vanblerk, J. Prinsloo, and J. Vanleeuwen.
1977, 9p
Conf-Presented at the Intern. Conf. On Advan. Treat. And Reclamation of Wastewater.

Keywords: Activated sludge, *Water treatment, Water reclamation, Calcium oxides, Fluid filters, Industrial plants, *Sewage treatment, Physical chemical treatment, Activated sludge treatment, South Africa.

The reclamation of water from biofilter humus tank effluent and activated sludge effluent by a physical-chemical process was studied at a 4,500 cu m d/1 water reclamation plant. Lime clarification followed by quality equalization, ammonia stripping, recarbonation, sand filtration, chlorination, active carbon adsorption, and chemical stabilization produced a high quality potable water from humus tank effluent. Water was reclaimed from activated sludge effluent utilizing the same process without quality equalization and ammonia stripping. The simplified process was easier to control and rendered a product water of comparable quality. In processing activated sludge effluent, consumption of chemicals was less and reclamation costs were reduced by 20 to 30%, depending on the size of the plant.

N78-27522/9 PC A09/MF A01
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Proceedings of the Alternate Energy Systems Seminar.
30 Mar 78, 184p Rept nos. NASA-CR-157255, JPL-PUB-78-45
Contract NAS7-100
Subm-Sponsored in Part by Doe. Conf-Seminar Held at Pasadena, Calif., 30 Mar. 1978; Sponsored by Doe.

Keywords: Clean energy, Communicating, Energy conversion, *Solar energy, Technology transfer, Thermal energy, Earth resources, Energy conservation, Solar cooling, Solar heating, Systems engineering, Wind-power utilization, *Wind energy, *Energy source development, Meetings, Proceedings.

For abstract, see STAR 1618

N78-29570/6 PC A03/MF A01
CALMAC Mfg. Co., Englewood, N. J.
Design and Installation Package for a Solar Powered Pump.
Jul 78, 34p Rept no. NASA-CR-150740
Contract NAS8-32253
Subm-Prepared for Doe.

Keywords: Cooling systems, Heat pumps, Solar heating, Energy conversion efficiency, Energy storage, Performance, Solar collectors, Specifications, *Solar water pumps, Installing, Design, Drawings.

The design and installation procedures of a solar powered pump developed by Calmac Manufacturing Company are presented. Subsystem installation, operation and maintenance requirements, subsystem performance specifications, and detailed design drawings are included.

N78-29578/9 PC A02/MF A01
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Utilization of Solar Energy in Developing Countries: Identifying Some Potential Markets.
G. F. Hein, and T. A. Siddiqi. Feb 78, 13p Rept nos. NASA-TM-78964, DOE/NASA/1022-78/41
Contract E(49-28)-1022
Conf-Presented at the Ann. Meeting of the AM. Assoc. For the Advan. Of Sci., Washington, D.C., 12-17 Feb. 1978.

Keywords: Developing nations, Energy technology, *Marketing, *Solar energy, Economic factors, Electricity, *Haiti, Photovoltaic cells, Solar generators, Technology utilization, Developing countries, *Photovoltaic power system.

The potential use of solar electricity generated from photovoltaic cells is examined for nineteen developing nations. Energy and economic profiles are summarized for each country. A comparison is made between the use of autogeneration and photovoltaics in a rural area of Haiti.

N78-31538/9 PC A02/MF A01
Solar Engineering and Mfg. Co., Ft. Lauderdale, Fla.
Design Data Brochure: Solar Hot Water System.
Jul 78, 21p Rept no. NASA-CR-150699
Contract NAS8-32247
Subm-Prepared for Doe.

Keywords: *Buildings, Solar heating, Systems engineering, Water, Energy sources, Energy technology, Solar collectors, Solar energy conversion, Tables (Data), *Solar heating systems, Solar water heaters, Hot water heating, *Solar water heating.

A design calculation is detailed for a single-family residence housing a family of four in a nonspecific geographical area. The solar water heater system is designed to provide 80 gallons of 140 F hot water per day.

N78-32546/1 PC A02/MF A01
Honeywell, Inc., Minneapolis, Minn. Energy Resource Center.
Solar Heating and Cooling Systems Design and Development.
Jul 78, 22p Rept no. NASA-CR-150786
Contract NAS8-32093
Subm-Prepared for Doe.

Keywords: Cooling systems, Solar heating, Research and development, Solar energy, Energy sources, Prototypes, Solar energy conversion, *Solar heating systems, *Solar cooling systems, Prototypes.

The development and delivery of prototype solar heating and cooling systems for installation and operational test are detailed.

N78-33537/9 PC A10/MF A01
Martin Marietta Aerospace, Denver, CO.
Applications of Thermal Energy Storage in the Cement Industry.
Final Report, Sep. 1977 - Mar. 1978.
F. A. Jaeger, D. G. Beshore, F. M. Miller, and E. M. Gartner. Oct 78, 205p Rept nos. NASA-CR-159399, CONS/5084-1
Contract EC-77-C-01-5084, EC-77-A-31-1034
Subm-Sponsored by NASA Prepared in Cooperation with Portland Cement Assoc.

Keywords: *Energy conservation, Heat storage, Industrial energy, Economic analysis, Feasibility analysis, Industrial wastes, Manufacturing, Waste utilization, *Waste heat utilization, *Cement, Industries.

In the manufacture of cement, literally trillions of Btu's are rejected to the environment each year. The purpose of this feasibility study program was to determine whether thermal energy storage could be used to conserve or allow alternative uses of this rejected energy. This study identifies and quantifies the sources of rejected energy in the cement manufacturing process, established use of this energy, investigates various storage system concepts, and selects energy conservation systems for further study. Thermal performance and economic analyses are performed on candidate storage systems for four typical cement plants representing various methods of manufacturing cement. Through the use of thermal energy storage in conjunction with waste heat electric power generation units, an estimated 2.4 x 10 to the 13th power Btu/year, or an equivalent on investment of the proposed systems are an incentive for further development.

N79-10516/9 PC A03/MF A01
General Electric Co., Philadelphia, PA.
Solar Heating and Cooling System Design and Development.
Status Summary, Apr. - Jun. 1978.
Jul 78, 43p Rept no. NASA-CR-150803
Contract NAS8-32092
Subm-Prepared for Doe.

Keywords: Cooling systems, Solar cooling, Solar heating, Design analysis, Energy conversion efficiency, Heating equipment, Maintenance, Prototypes, *Solar cooling systems, *Solar heating systems, Residential buildings, Commercial buildings.

The development of eight prototype solar heating and combined heating and cooling systems is reported. Manufacture, test, installation, maintenance, problem resolution, and monitoring the operation of prototype systems is included. Heating and cooling equipment for single family residential and commercial applications and eight operational test sites (four heating and four heating and cooling) is described.

N79-10528/4 PC A09/MF A01
Levelton (B. H.) and Associates Ltd., Vancouver (British Columbia).
An Evaluation of Wood-Waste Energy Conversion Systems.
B. H. Levelton. 31 Mar 78, 199p

Keywords: *Fuels, Wood, Boilers, Fluidized bed processors, Gasification, Materials recovery, Systems analysis, Technology utilization, *Bioconversion, Canada, *Wood wastes, Solid waste disposal, Reclamation, Biomass.

The British Columbia Wood Waste Energy Co-Ordinating Commission was formed to evaluate the potential increased use of wood waste as an energy source in British Columbia. As part of this program, the committee commissioned a study of the technology available for recovering energy from wood waste and evaluation of the merits of various systems available for energy recovery. The terms of reference of the study may be summarized as follows: (1) identify potential applications in the forest-products industry for wood-waste fuels to replace fossil fuels; (2) identify and assess the relative merits of the various classes of systems for wood energy conversion; and (3) identify and evaluate specific existing commercial and pilot-scale systems for wood-energy conversion with emphasis on all possible end uses of each system.

N79-11627/3 PC A06/MF A01
Societe Francaise d'Etudes et de Realisations d'Equipments Aeronautiques (Sofreavia), Paris (France).
Study of the Situation and the Needs in Africa Relating to Meteorological Telecommunications.
G. A. Delorme, and J. M. Rainer. Mar 78, 104p Rept no. ESA-CR(P)-1091
Contract ESA-3530/78-F-FC(SC)

Keywords: Africa, Weather stations, International cooperation, Aircraft communication, Communication satellites, Data collection platforms, Data links, Meteorological satellites, Point to point communications, Radio communication, Spacecraft communication, Underwater communication, *Meteorology, France, Weather communication.

The organization of meteorological telecommunications at global and African regional level is recalled and the situation concerning the operation of the African regional and national networks with reference to WMO recommendations is reviewed. Operation of the various components of the regional plan is examined: point-to-point circuits, radio broadcasts, networks for assembly of synoptical, and ship and aircraft data. The shortcomings and deficiencies in the use of equipment and with the operation of the system are noted and prospects for improvement are listed. The advantages of circuits using underwater cables and communication satellites over HF radio circuits are stressed, as is the adaptation to the needs of the national SSB (single sideband)/ HF networks. In the case of a developing continent, utilization of space systems for meteorological telecommunications, which has already started with WEFAX dissemination and the collection of data, seems to have a real future. Taking into account the reliability of service by satellite - and apart from the transmission of data from the National Meteorological Center to the Regional Telecommunication Hub (RTH) which is akin to collection - all the other telecommunication functions required for meteorology can be carried out through broadcasts. Proposals for a satellite telecommunications system for meteorological needs are made.

N79-13498/7 PC A03/MF A01
Solaron Corp., Denver, CO. Solaron Energy Systems.
Prototype Solar Heating and Cooling Systems Including Potable Hot Water.
Quarterly Report.
Oct 78, 35p Rept no. NASA-CR-150850
Contract NAS8-32249
Subm-Prepared for Doe.

Keywords: Potable water, Solar energy, Water temperature, Cooling systems, Heating, Prototypes, *Solar heating systems, *Solar cooling systems, *Solar water heating, Hot water heating.

These combined quarterly reports summarize the activities from November 1977 through September 1978, and over the progress made in the development, delivery and support of two prototype solar heating and cooling systems including potable hot water. The system consists of the following subsystems: solar collector, auxiliary heating, potable hot water, storage, control, transport, and government-furnished site data acquisition.

N79-15411/8 PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH., Lewis Research Center.
Photovoltaic Power Systems for Rural Areas of Developing Countries.
L. Rosenblum, W. J. Bifano, G. F. Hein, and A. F. Ratajczak. 1979, 19p Rept nos. NASA-TM-79097, E-9921
Conf-Presented at the Intern. Seminar on Solar Energy, Tokyo, 5-10 Feb. 1979; Sponsored by the United Nations and Govt. Of Japan.

Keywords: Developing nations, Photovoltaic conversion, Rural areas, Technology utilization, Utilities, Arizona, Cost effectiveness, Educational television, Industries, Solar cells, Upper Volta, *Photovoltaic power system, Developing countries, *Electric power.

Systems technology, reliability, and present and projected costs of photovoltaic systems are discussed using data derived from NASA, Lewis Research Center experience with photovoltaic systems deployed with a variety of users. Operating systems in two villages, one in Upper Volta and the other in southwestern Arizona are described. Energy cost comparisons are presented for photovoltaic systems versus alternative energy sources. Based on present system technology, reliability, and costs, photovoltaics provides a realistic energy option for developing nations.

N79-16377/0 PC A10/MF A01
Burns and McDonnell, Kansas City, MO.
Assessment of the Potential of Solar Thermal Small Power Systems in Small Utilities.
Final Report.
P. Steitz, L. G. Mayo, and S. P. Perkins, Jr. Nov 78, 222p Rept nos. NASA-CR-158093, JPL-1060-14
Contract JPL-954971
Subm-Prepared for JPL and Doe.

Keywords: Economic factors, Solar generators, Utilities, Concentrators, Parabolic antennas, Rankine cycle, Solar energy conversion, *Electric power, Electric power plants, *Solar thermal power plants, Tower focus power plants, Assessments, Economic analysis.

The potential economic benefit of small solar thermal electric power systems to small municipal and rural electric utilities is assessed. Five different solar thermal small power system configurations were considered in three different solar thermal technologies. The configurations included: (1) 1 MW, 2 MW, and 10 MW parabolic dish concentrators with a 15 kW heat engine mounted at the focal point of each dish, these systems utilized advanced battery energy storage; (2) a 10 MW system with variable slat concentrators and central steam Rankine energy conversion, this system utilized sensible thermal energy storage; and (3) a 50 MW central receiver system consisting of a field of heliostats concentrating energy on a tower-mounted receiver and a central steam Rankine conversion system, this system also utilized sensible thermal storage. The results are summarized in terms of break-even capital costs. The break-even capital cost was defined as the solar thermal plant capital cost which would have to be achieved in order for the solar thermal plants to penetrate 10 percent of the reference small utility generation mix by the year 2000. The calculated break-even capital costs are presented.

N79-18455/0 PC A05/MF A01
Stuttgart Univ. (Germany, F.R.). Foreschungsinst. Windenergietechnik.
Expert Opinion on Wind Energy Conversion Systems Designed by Hermann Honnef.
Final Report.
H. Doerner. Dec 77, 80p Rept no. BMFT-FB-T-77-35
Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Keywords: Windpower utilization, Systems engineering, Aerodynamic characteristics, Cost effectiveness, High altitude, Rotors, Test facilities, Towers, Turbine blades, Turbines, Windpowered generators, *Wind energy, Wind power, *Turbines, Comparison.

The plans by Hermann Honnef for using wind power by means of large-scale wind energy conversion systems with regard to the proposed technical design and their presently expected cost-effectiveness were assessed. The conclusion that the findings and experience of the past few decades have shown that this type of wind energy conversion systems using contra-rotating, multi-blade turbines are not economical. The cost-effectiveness of this type was compared unfavourably with the advanced type of free-running, two-bladed turbines. The assertion that wind conditions at altitudes between 200 and 500 m were sufficiently explored for the purpose of wind energy facilities, is not valid.

N79-18460/2 PC A03/MF A01
Bundesministerium fuer Wissenschaft und Forschung, Vienna (Austria).
Austrian 10KWE Solar Power Plant. A Project of the Federal Ministry for Science and Research.
1977, 28p

Keywords: *Electric power, Solar energy conversion, Austria, Energy technology, Structural engineering, Technology assessment, Electric generators, Electric networks, Energy storage, Solar collectors, Systems engineering, Working fluids, *Solar thermal power plants, Solar power plants, Developing countries, Heat storage.

Concepts under development in other nations were surveyed to clarify available options in the design and construction of a small solar energy plant suitable for use in developing countries. The possibility of marketing an Austrian-made power plant capable of operating without human service was assessed as well as the possibility of supplying single components to users. Aspects of the design under consideration discussed include collector circuits, freon circuits, prime movers, generator and electric networks, plant performance, and thermal storage.

N79-31779/8 PC A08/MF A01
National Aeronautics and Space Administration, Washington, DC.
Investigation of a Generator System for Generating Electrical Power, to Supply Directly to the Public Network, Using a Windmill.
C. Tromp. Aug 79, 158p Rept no. NASA-TM-75497
Contract NASW-3199

Keywords: Electric generators, Windpowered generators, Windmills, Windpower utilization, Current converters (Ac to dc), Electric networks, Electric potential, Electric power transmission, Energy conversion efficiency, Stators, Synchronous motors, Transformers, Voltage regulators, Wind velocity, *Wind energy, *Electric power, Translations, Wind power generation, Electric power plants, Wind power plants.

A windpowered generator system is described which uses a windmill to convert mechanical energy to electrical energy for a three phase (network) voltage of constant amplitude and frequency. The generator system controls the windmill by the number of revolutions so that the power drawn from the wind for a given wind velocity is maximum. A generator revolution which is proportional to wind velocity is achieved. The stator of the generator is linked directly to the network and a feed converter at the rotor takes care of constant voltage and frequency at the stator.

N80-12552/9 PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH., Lewis Research Center.
A Photovoltaic Power System in the Remote African Village of Tangaye, Upper Volta.
W. J. Bifano, A. F. Ratajczak, and J. E. Martz. 1979, 17p Rept nos. NASA-TM-79318, E-274
Subm-Sponsored in Part by Aid. Conf-Presented at Unitar Conf. On Long-Term Energy Resources, Montreal, 26 Nov. - 7 Dec. 1979.

Keywords: Developing nations, Photovoltaic cells, Solar energy conversion, Upper Volta, Economic impact, Social factors, Systems engineering, Systems management, *Photovoltaic power system, *Water pumps, *Solar water pumps, Electric power generation, Solar cells.

A photovoltaic (PV) system powering a grain mill and a water pump was installed in the remote West African village of Tangaye, Upper Volta. Village characteristics as well as system design, hardware, installation and operation to date are described. The PV system cost is discussed. A baseline socio-economic study performed and a follow-up study is planned to determine the impact of the system on the villagers.

N80-15422/2 PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH., Lewis Research Center.
Photovoltaic Power System Reliability Considerations.
V. R. Lalli. 1980, 9p Rept nos. NASA-TM-79291, DOE/NASA/20370-79/19
Contract DE-AB29-76EI-20370
Conf-Presented at the Ann. Reliability and Maintainability Symp., San Francisco, 22-24 Jan. 1980.

Keywords: Electric power plants, Photovoltaic conversion, Reliability engineering, Solar energy, Africa, Developing nations, Quality control, Safety factors, System effectiveness, *Electric power, *Photovoltaic power system.

An example of how modern engineering and safety techniques can be used to assure the reliable and safe operation of photovoltaic power systems is presented. This particular application is for a solar cell power system demonstration project designed to provide electric power requirements for remote villages. The techniques utilized involve a definition of the power system natural and operating environment, use of design criteria and analysis techniques, an awareness of potential problems via the inherent reliability and FMEA methods, and use of fail-safe and planned spare parts engineering philosophy.

N80-18415/3 PC A03/MF A01
Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
Flutter Analysis of Small Windturbine, Designed for Manufacture and Use in Developing Countries.
P. C. Hensing. Aug 78, 29p Rept no. UTH-LR-272

Keywords: Flutter analysis, Rotor blades (Turbomachinery), Windpowered generators, Bending vibration, Blade tips, Design analysis, International cooperation, Stiffness matrix, Turbogenerators, *Turbines, *Wind energy.

The flutter behavior of a wind turborotor designed for manufacture and use in developing countries was investigated. Possible improvements are discussed. The effect of scaling is considered. Results show that the addition of small tip-masses has a curative influence on flutter sensitive rotor designs.

N80-28561/0 PC A06/MF A01
Indian Space Research Organization, Ahmedabad. Space Applications Centre.
Satellite Instructional Television Experiment. Television Comes to Village: An Evaluation of Site.
B. C. Agrawal. Oct 78, 107p Rept no. ISRO-SAC-TR-09-78

Keywords: Educational television, Satellite television, Social factors, Agriculture, Children, Culture (Social sciences), Education, *India, Parents, Programs, Rural areas, *Education, *Television.

The design and conclusions of India's satellite instructional television experiment (SITE) are presented and discussed. The socio-cultural changes triggered by the introduction of satellite TV were the central interest of the investigation. Seven villages, one each from six clusters and Kheda, about 20 to 30 km away from an urban centre and least contaminated by urban influence were selected. The field work was divided into three phases: pre-SITE, during-SITE, and post-SITE. Anthropological field methods were the main tools of data collection. The data were analyzed at two levels; household and village. Instructional, recreational, and children's programs were broadcast. Results indicate that, due to TV exposure, a number of innovations were adopted. Also, viewers' attendance was found to be intimately linked to agricultural and religious activity cycles of the village. The major implications which can be drawn to provide planning inputs for future national satellite based TV systems are summarized addressing problems in program type, schedules, and language differences.

N80-29844/1 PC A02/MF A01
National Aeronautical Lab., Bangalore (India).
A Horizontal Axis Sail Windmill for Use in Irrigation.
S. K. Tewari. Mar 79, 22p Rept no. NAL-TN-54

Keywords: *Irrigation, Windmills, Windpower utilization, Windpowered pumps, Electric generators, Farmlands, Gears, Windpowered generators, *Wind energy, *Turbines.

Some basic considerations in the design and development of a horizontal axis windmill, intended primarily for irrigation in small farms from shallow open wells are described. This windmill has six triangular sails sweeping a circle of 10 meters in diameter, and is an adaptation from Greek sail windmills. For the construction of this windmill, all efforts are made to use materials and parts readily available in the hardware market except for the gear boxes. The cost of material and parts is approximately $900 which excludes cost of machining and fabrication charges. Preliminary performance tests indiate a pumping rate of 6000 to 11,000 liters/hour over a head of 6.85 meters in wind speeds of 10 to 16 km/hr.

N80-33867/6 PC A07/MF A01
Elcam, Inc., Santa Barbara, CA.
Design Package for Solar Domestic Hot Water System.
Sep 80, 149p Rept no. NASA-CR-161558
Contract NAS8-32245
Sponsored in Part by DOE.

Keywords: Hoat storage, Residential energy, *Solar collectors, *Solar heating systems, *Solar water heating, Auxiliary power sources, Engineering drawings, Performance prediction, Storage tanks.

The initial design of a solar domestic hot water system is considered. The system performance specification and detailed design drawings are included. The hot water systems consist of the following subsystems: collector, storage, control, transport, auxiliary energy, and government-furnished site data acquisition. The two systems are installed at Tempe, Arizona, and San Diego, California.

N80-75440/1 PC A06/MF A01
Indian Space Research Organization, Bangalore.
Satellite Instructional Television Experiment: Technical Evaluation of the Ground Segment
Technical rept. Aug 75-Jul 76.
Oct 77, 112p Rept no. ISRO-SAC-TR-06-77

Keywords: Artificial satellites, *India, Telecommunications, Rural areas, *Education, Children, Adults, Television systems, Television broadcasting, *Television.

The Satellite Instructional Television Experiment (SITE), conducted during August 1975-July 1976, was the largest experiment of its kind to be conducted anywhere. The SITE system consisted of two experimental earth stations, a 1 KW transmitter, 2400 Direct Reception Systems in as many villages and the associated maintenance organization setup, two TV studios, a limited rebroadcast transmitter and supporting communication links. Doordarshan, of the Ministry of Information and Broadcasting, operated three Base Production Centers. This document describes briefly the development efforts towards, and performance results of, the SITE system hardware, together with analysis of the performance.

N81-13574/1 PC A05/MF A01
Tata Energy Research Inst., Bombay (India).
Solar Radiation on Inclined Surfaces.
May 80, 82 Rept no. NP-25081

Keywords: Data bases, India, Short wave radiation, *Solar energy, Solar radiation, Tables (Data), Data acquisition, Electromagnetic radiation, Incident radiation, Radiation measurement, *India.

Mean monthly values of daily shortwave radiation on inclined surfaces are presented for 13 locations in India. Values of direct, diffuse sky, reflected, and total shortwave radiation incident on an inclined surface are given for 9 slope angles (measured from the horizontal) and 8 aspects. All the data are computed using measured values of the total shortwave radiation on a horizontal surface according to the techniques described. Maximum and minimum values of direct solar radiation during each month are underlined and marked by asterisk respectively. Actual and potential users of radiation data, particularly those in the fields of agriculture, horticulture, forestry, architecture, heating and ventilating engineering, and photovoltaic systems, it is hoped, would find this publication useful in planning and designing of solar radiation devices.

N81-20581/7 PC A06/MF A01
Lund Univ. (Sweden).
Marine Biomass: Algae as Source of Energy.
L. Edler, T. Vonwachenfeldt, and L. Emmelin. Apr 80, 115p Rept no. NE/BIO-80/12

Keywords: *Algae, Biomass energy production, *Energy, Marine environments, *Methane, Baltic sea, *Bioconversion, Coastal water, Fermentation, Shallow water, Sweden, Foreign technology.

Calculations based on data from laboratory and field measurements indicate that a production of as much as 115 tons of algae (dry matter) per hectare and year could be achieved. Culture of marine algae along the Swedish coast would probably take place in shallow, sheltered waters. Using a succession of naturally occuring species a growing season of 240 days could be achieved. With a production of 115 tons dm.ha/1 year/1 an output of approximately 110 MWhT.ha/1 year/1 of methane gas would be feasible using anaerobic fermentation. The area of the Baltic inside the 5 m depth curve is 19,000 sq km. If 10% of this area were available, a production of around 20 TWhT of gas annually would be the maximum potential of the system. A system is described for growing algae in the shallow marine environment. Energy analysis of the system indicates that approximately 5% of the energy output from an algae based methane plant would be required for growth, harvesting and conversion to methane.

N81-21550/1 PC A03/MF A01
Delegationen foer Energiforskning, Stockholm (Sweden).
Production of a Raw Material for Energy Production in Agriculture.
G. Hellstroem. Apr 80, 48p Rept no. DFE-31

Keywords: *Agriculture, Biomass energy production, Farm crops, Fuel production, *Crops, *Fuels, *Leguminous plants, *Plants (Botany), *Sweden, Cost estimates, Hydrocarbon fuels, Rural land use, Vegetation growth, Foreign technology.

The total amount of energy in products produced by Swedish agriculture was estimated to 80 TWH: 30 TWh for cereals, 15 TWh for grass and leguminosae, and 35 TWh for straw and other agricultural wastes. Of this production a large part will be used as food even in the future. New plants that would produce more energy than the ones traditionally grown in Sweden are discussed. Also other types of energy from agriculture are discussed such as methane from manure, methanol from gasification processes, and ethanol from fermentative processes. Costs were estimated from different alternatives.

N81-24530/0 PC A10/MF A01
DHR, Inc., Washington, DC.
Market Assessment of Photovoltaic Power Systems for Agricultural Applications in the Philippines.
Final Report.
R. A. Cabraal, D. Delasanta, and G. Burrill. Apr 81, 205p Rept nos. NASA-CR-165286, DOE/NASA/0180-1
Contract DEN3-180, DE-AI01-79ET-20485

Keywords: *Agriculture, Energy conversion efficiency, *Management planning, *Philippines, *Photovoltaic power system, Photovoltaic conversion, Power conditioning, Feasibility analysis, Food processing, Irrigation, Market research, Storage, Technology assessment.

The market potential in the Philippines for stand alone photovoltaic (P/V) systems in agriculture was assessed. Applications include: irrigation, postharvest operation, food and fiber processing and storage, and livestock and fisheries operations. Power and energy use profiles for many applications as well as assessments of business, government and financial climate for P/V sales are described. Many characteristics of the Philippine agriculture and energy sector favorably influence the use of P/V systems. However, serious and significant barriers prevent achieving the technically feasible, cost competitive market for P/V systems in the agricultural sector. The reason for the small market is the limited availability capital for financing P/V systems. It is suggested that innovative financing schemes and promotional campaigns should be devised.

N81-70836/0 PC A10/MF A01
Indian Space Research Organization, Bangalore.
Satellite Instructional Television Experiment: Social Evaluation - Impact on Adults, Part 2
Technical rept.
Binod C. Agrawal, J. K. Doshi, Victor Jesudason, and K. K. Verma. Sep 77, 203p Rept no. ISRO-SAC-TR-07-77

Keywords: *Education, Artificial satellites, Statistical analysis, Tables(Data), *India, Rural areas, Surveys, Public health, Children, Adults, Television systems, *Television.

In Part I of the report, the analysis of social impact of SITE on adults for all the clusters has been presented. While doing so references have been made to cluster analysis and other details which are presented in Part II of the report. The Part II contains 10 appendices--except the first four, the remaining six appendices contain the cluster-wise analysis of the same data presented for all clusters in the report earlier. In the first four appendices an attempt has been made to provide those details which could not be provided in the main body of the report.

N82-19692/4 PC A05/MF A01
Dortmund Univ. (Germany, F.R.). Inst. fuer Umweltschutz.
A Solar High Temperature Kiln.
Final Report.
N. Huettenhoelscher, and K. Bergmann. Nov 81, 93p Rept nos. BMFT-FB-T-81-181, ISSN-0340-7608

Keywords: Construction materials, Ovens, *Solar collectors, Solar heating, Baking, Ceramics, Concentrators, Developing nations, High temperature environments, Solar energy, *Building materials, *Industrial plants, Foreign technology.

The feasibility of using solar energy in developing countries for baking ceramic construction materials was investigated. The solar high temperature kiln is described. It uses two parabolic concentrators which direct available radiation into the baking chamber. The Sun tracker has only one axis. Preliminary test results with the prototype kiln were satisfactory.

ORNL/TM-7620 PC A04/MF A01
Oak Ridge National Lab., TN.
Environmental Issues and Site Selection Criteria for Small Hydropower Projects in Developing Countries
G. F. Cada, and F. Zadroga. Mar 81, 55p
Contract W-7405-ENG-26

Keywords: Developing countries, *Hydroelectric power, *Environmental impacts, Feasibility studies, Land use, *Site selection, Socio-economic factors, Water resources.

Small Hydropower Projects (SHPP), i.e., those with capacities of 1000 kW or less, have great potential for elevating the standard of living and contributing to the economic growth of isolated rural communities in developing countries. However, construction and operation of a SHPP can result in adverse environmental impacts that should be considered in the initial stages of site selection and development. Environmental concerns can be factored into a site selection process both at the prefeasibility and feasibility stages. The prefeasibility study is the process by which a large number of potential sites is reduced to a much smaller number of candidate sites based on coarse-grained engineering, socioeconomic, and environmental criteria. Although many of the factors determining the suitability of a given site at the prefeasibility stage involve basic engineering or economic questions (e.g., availability of water and demonstrated need for power), four fundamental environmental issues that should be addressed are discussed in this report. The feasibility study is the final stage of site selection, where a relatively small number of candidate SHPP sites are examined in greater detail and the best are selected for development. Potential environmental impacts of SHPP's are discussed, and a checklist of environmental data that should be collected in order to judge the significance of the projected impacts is provided. Finally, recommendations are made as to the necessary train-

ing and capabilities of the personnel involved in the site selection studies and the general procedures by which the studies may be conducted. (ERA citation 06:013578)

ORO-5099-T1 PC A08/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Energy Conservation in the Textile Industry. Phase I
F. L. Cook, J. E. Dawkins, D. S. Brookstein, W. C. Carter, and R. H. Fulford. 1977, 167p
Contract EY-76-S-05-5099

Keywords: *Textile industry, *Energy conservation, Data compilation, Energy consumption, Materials, Research programs, Tables, Industries.

Energy conservation potential of each major process (batch and continuous) is estimated in this Phase I report. The approach was to gather process energy-consumption data from available literature and selected companies and to develop a production matrix by wet process within the industry. For Phase II, equipment and procedure modifications are being developed to demonstrate energy savings. (ERA citation 04:050201)

ORO-5099-T2 PC A18/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Energy Conservation in the Textile Industry. Phase II. Final Report, June 1977-August 1978
F. L. Cook, W. W. Carr, W. C. Tincher, D. S. Brookstein, and W. C. Carter. Oct 78, 420p
Contract EY-76-S-05-5099

Keywords: *Textile industry, Color, Cost benefit analysis, Dyes, Education, *Energy conservation, Energy consumption, Graphs, Numerical data, Processing, Research programs, Resource conservation, Tables, Textiles.

Phase I developed a profile of the energy consumption of major energy intensive wet processes in the textile manufacturing industry and identified major energy intensive wet processes where energy conservation research would be most productive. It is briefly described and Phase II developed and demonstrated, on a pilot or full scale basis, energy conserving modifications for selected processes identified in Phase I and analyzed additional areas of energy research identified in Phase II; examined cost-benefit relationships of proposed process modifications; and disseminated research results to the industry through short courses, workshops, trade publications, organizations, and relevant Georgia Tech courses. Some of the more promising advancements in the wet processing area discussed are dyeing, preparation of fabrics, and finishing. (ERA citation 05:024300)

ORO-5362-T1 PC A12/MF A01
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.
Solar Energy for Buildings Handbook
D. L. Christensen. Oct 79, 268p
Contract EG-77-S-05-5362

Keywords: *Buildings, *Solar energy, Biomass, Diagrams, Economics, Educational tools, Energy conservation, Forecasting, Manuals, Passive solar cooling systems, Solar heating systems, Photovoltaic power plants, Solar heating, Solar thermal power plants, Wind power.

This handbook contains presentation materials and supporting text suitable for presentations, education, short courses, etc., for general audiences, as well as government officials and members of the building trade. The following are discussed: conservation, solar energy, economics, obstructions, and the future. (ERA citation 05:020254)

ORO-5912-T2 PC A07/MF A01
Puerto Rico Univ., Rio Piedras. Agricultural Experiment Station.
Production of Sugarcane and Tropical Grasses as a Renewable Energy Source. Second Annual Report, 1978-1979
1979, 134p
Contract ET-78-S-05-5912

Keywords: *Grass, *Sugarcane, Feasibility studies, Field tests, Greenhouses, Moisture, Plant growth, Production, Renewable energy sources, Solar drying, *Fuels.

Reseach continued on tropical grasses from Saccharum and related genera as sources of intensively-produced, solar-dried biomass. Categories of candidate grasses include short-, intermediate-, and long-rotation species. These categories are based on the time interval required for maximum dry matter production, and on future management requirements of energy crops for intensive co-production with food crop commodities. Year 1 studies at the greenhouse and field-plot levels were continued and broadened during Year 2. This included candidate screening, importation and quarantine of new clones, breeding, controlled nitrogen and water regimes, chemical growth control, tissue expansion and maturation control, seeding rates, harvest frequency, and variable row spacing. Second-year studies were extended to the project's field-scale and mechanized-harvest phases. These include initial economic anayses for the short-rotation phases. These include initial economic analyses for the short-rotation category of candidate species. (ERA citation 05:017513)

PB-169 304/3 PC A02/MF A01
Forest Products Lab., Madison, WI.
Condensation in Farm Buildings.
Research note.
Jan 66, 9p Rept no. FPL-0114
Revision of Report no. 1186.

Keywords: *Buildings, Condensation, Control, Water vapor, Rural areas, Moisture, Humidity, Ventilation, Moistureproofing, Permeability.

The method of controlling or preventing the condensation in farm buildings and other structures involves a particular set of conditions, each of which must be considered separately. A review of the principles of water vapor and condensation is provided for the purpose of establishing a basis for analyzing the problem. The control of factors contributing to condensation by means of ventilation, vapor-permeable constructions, and vapor barriers is discussed.

PB-170 306/5 PC A10/MF A01
American Scientific Corp., Alexandria, VA.
Creating a Ceramics Industry on the Blackfeet Reservation.
Emmett F. Deady, Saul S. Gefter, Natalie Marra, and Robert F. Custard. Sep 65, 203p
Contract EDA-14-20-0650-1379

Keywords: Economics, Montana, Industries, Ceramic materials, Feasibility studies, Labor, Commerce, Employment, Management engineering, *Ceramics, *Industrial Plants, Ceramics industry, Indian reservations, Area redevelopment.

The study reports that there exists at the Blackfeet Reservation a sufficient labor pool endowed with ceramic production capabilities and that all other factors controlling the success of such an industry are in evidence, provided the enterprise can be financed. It resolves that the plant should be directed to the production of art pottery, particularly fine figurines and pottery designed to reflect the American Indian tradition. It determined that the optimum method of production is slip casting but recommends flexible molding as soon as practical and suggests lines of experiments so directed. The study examines the market for Indian art pottery and recommends specific items at specific prices, and undertakes to predict sales quotas of such items. It shows that there is an annual sales of $21,000,000 in the U. S. alone of art ceramic items and that there is no commercially produced Indian pottery of any significance at this time. It proposes that a $100,000 penetration of this market is less than one-half of one percent, and concludes that this is feasible. The study recommends a program of facilities and equipment starting with a 4,940 square foot plant employing 20 people to be expanded to a 10,000 square foot plant employing 129 people, with a corallary ceramics industry to employ another 125 over a ten year program. It proposes a plan of implementation including management, capital, labor, and facility requirements over a ten year period to be financed with an investment of $250,000 and shows that a break-even point is possible by the end of the first full year of operation. (Author)

PB-170 327/1 PC A03/MF A01
Hawaii State Dept. of Planning and Economic Development, Honolulu.
Feasibility of Processing Tropical Fruit Concentrates in Puna, Hawaii.
Jun 65, 48p Rept no.
Prepared in cooperation with Economic Development Administration, Washington, D. C.

Keywords: Economics, Hawaii, *Fruits, *Beverages, Feasibility studies, Processing, Dehydrated foods, Pectins, Costs, Concentration(Chemistry), Food, Industries, *Food processing, Area redevelopment.

A pilot plant operation to determine the feasibility of processing tropical fruits with acerola plant equipment was a definite success. The technicians who carried out the pilot plant operation have concluded it is technically possible to produce high quality concentrates from passion fruit, guava and papaya on a commercial scale. No serious technical problems were encountered in the operation. In making these concentrates, the technologists attempted to get the highest brix reading possible instead of stopping at a lower and possibly more practical level of concentration. Subsequent product development work by the technologists proved satisfactory products could be made utilizing these concentrates. These products were jams, jellies, nectar bases, 2nd flaverings. An economic analysis of a projected full-scale commercial operation resulted in a very optimistic profit picture. These results apply only to the Puna District of Hawaii which offers unique advantages to the proposed operation. (Author)

PB-174 346/7 PC A04/MF A01
Forest Products Lab., Madison, WI.
Houses Can Resist Hurricanes.
Research paper
L. O. Anderson, and Walton R. Smith. Aug 65, 52p
Rept no. FPL-33
Prepared in cooperation with Southeastern Forest Experiment Station.

Keywords: Construction materials, Tropical cyclones, *Building materials, *Housing, *Natural hazards, Tropical cyclones, Structures, Damage control, Hurricane, Foundations(Structures), Storms.

The report is based on a study of hurricane damage to man-made structures over a period of years. Not all damage can be eliminated. but a very high percentage of damage observed in the past could have been avoided with simple, inexpensive commonsense principles applied to building construction. Some of these principles are demonstrated here--especially in respect to the value of good foundations and the importance of ties between parts of the structure. (Author)

PB-175 521/4 PC A09/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Metal-Working Industry Training Manual.
1957, 184p Rept no. Technical Bull-62

Keywords: Instruction manuals, Machine shop practice, Industrial training, Material forming, Metals, Dies, Material removal, Heat treatment, Industrial equipment, Operation, Supervisory personnel, Management engineering, *Training, *Machine tools.

The manual contains material about the manufacturing practices and operational methods in the metal-working industry, relating principally to the use of machine tools and related equipment for manufacturing component parts of final products. It explains the efficient utilization of metal-working equipment, and allied problems of tooling, plant lay-out, methods, and the development of a program to assist the industry on production problems through a training program. This training program has been developed for senior management personnel, work managers, and foremen for the proper selection of machinery; utilization of machine tools; layout of production line; design, use, and making of jigs and fixtures; problems involving setup, machine loading, machine speeds, testing and quality control, selection of cutting tools, tool designs, tool-making and tool maintenance; and safety devices and programs in the shop. (Author)

PB-175 522/2 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.

Planing Mill Dressed or Finished Lumber.
Dec 56, 47p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Keywords: *Wood, Industries, Aging(Materials), Drying, Air, Heat, Machine tools, Costs, Industrial equipment, Personnel, Saws, Operation, Commerce, Structural parts, *Industrial plants.

Contents: Function of the planing mill; Lumber; Lumber seasoning; Air drying; Kiln drying; Grading lumber; Machinery and equipment; Buildings; Personnel; Research; Accounting instructions; Investment and working capital requirements.

PB-175 523/0 PC A04/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements to Set Up and Operate Small Bread Bakeries.
Mar 60, 63p
Prepared in cooperation with Holman (John F.) and Co., Inc., Washington, DC.

Keywords: Bread, Manufacturing methods, *Industrial plants, Specifications, Industrial production, Costs, Labor, Economics, Power, Industrial equipment, Fuels, Transportation, Water, *Food products.

Contents: General assumptions; Manufacturing operations; Plant site; Building requirements; Plant layout; Power; Water; Fuel; Transportation; Machinery and equipment; Production equipment; Direct labor requirements; Direct materials; Furniture and fixtures; Supplies; Cost breakdown per pound for white bread; Indirect labor cost; Depreciation; Manufacturing overhead; Manufacturing cost (annual); Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales, and profits; Training; Sanitation; Safety; Conservation and accounting for losses in baking operations.

PB-175 524/8 PC A05/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Plant Requirements to Set Up and Operate a Brass Foundry.
Revised ed.
May 59, 85p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, DC

Keywords: *Industrial plants, Material forming, *Brass, Management engineering, Copper alloys, Aluminum alloys, Magnesium alloys, *Casting, Molding, Costs, Industrial equipment, Manufacturing methods, *Foundries.

The manual deals with subjects concerning brass foundry operations and techniques. However, matters pertaining to the casting of other metals in the nonferrous category have been included, since it is quite generally the practice in America to utilize identical facilities to cast brass, bronze, zinc, aluminum, magnesium and other nonferrous metals. The manual includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial and economic factors.

PB-175 525/5 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Mineral Wool.
Revised ed.
Mar 62, 40p
Prepared in cooperation with Vitro Engineering Co., Washington, DC.

Keywords: Industrial production, Thermal insulation, Manufacturing methods, Costs, Management engineering, Industrial equipment, *Industrial plants, *Mineral wool.

The purpose of this report is to present basic information relative to the establishment of a mineral wool plant in a foreign country. Mineral wool may be manufactured from rock, slag, or glass, any one of which may be processed from a molten state into a fluffy, light-weight mass of fine intermingled mineral fibers composed of complex silicates. This report pertains to the fabrication of loose and granulated mineral wool from slag. These materials are used mainly for thermal insulation by the building trades. When mineral wool is to be supplied to manufacturers of specialized acoustical and filter products, chemical analysis and control of the fiber and completed wool will be necessary to assure conformance to the customer's specifications. This plant will require a substantial capital investment and a reasonable number of skilled workmen. Raw materials should be available locally, particularly slag and coke. Generally, the less developed countries do not offer particularly favorable conditions for the production of mineral wool, nor a large enough domestic market to lead to a profitable venture. However, such a plant would be feasible in an industrially developing country where a large volume of new construction and industries would create a sufficient demand. A favorable factor would be association of the mineral plant with a factory processing high and low temperature mineral wool felts, industrial batts, blankets, blocks, boards, and molded pipe insulations. (Author)

PB-175 526/3 PC A03/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Plant Requirements for Manufacture of Candy and Confectionery.
Sep 57, 48p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Keywords: Food, Manufacturing methods, *Industrial plants, Industrial production, Specifications, Industries, Industrial equipment, Costs, Management planning, *Food products, Confectioneries.

Contents: Candy origin and usage; The candy industry; Requisites of successful confectionery manufacturing; Principal raw materials and their characteristics; Manufacturing processes of basic types of candy; Plant requirements - physical; Plant requirements - quality and costs; Cost ratios in the candy industry; Operating ratios in 1955 - typical for U. S. manufacturer-retailers; Financial forecast; Average cost per pound of selected ingredients used by the United States confection industry.

PB-175 527/1 PC A06/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Processing of Dairy Products.
May 62, 102p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Keywords: Food, Processing, *Milk, *Industrial plants, Industrial production, Industrial equipment, Dehydrated foods, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Instruction manuals, Specifications, *Dairies, *Food products, Dairy products.

The manual provides information on the processing of milk and other dairy products for human consumption. It is primarily intended to give the reader a basic understanding of production and marketing methods.

PB-175 531/3 PC A06/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
A Small Sawmill Enterprise.
Revised ed.
Apr 59, 101p

Keywords: *Wood, Industries, Machine tools, Portable, Saws, Operation, Costs, Labor, Money, Commerce, Law, Safety, Industrial equipment, Storage, Insects, Maintenance, Efficiency, Industrial procurement, *Industrial plants, *Small businesses, *Sawmills.

The publication contains machinery and processes for conversion of logs into lumber as an industrial enterprise, including both the mechanical and business aspects. It does not include the processes of extracting logs from forests or the seasoning of products of sawmills. It is intended to be useful to those considering the establishment of a small sawmill business in foreign countries, and may be helpful to some of those already conducting such a business. The selection, erection, and operation of small circular sawmills of standard and traditional types are described. (Author)

PB-175 532/1 PC A03/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Small Brass Foundry.
Oct 60, 35p Rept no. TR-26072-PR
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, DC.

Keywords: *Industrial plants, Material forming, *Brass, *Casting, Industrial equipment, Management engineering, Costs, *Foundries.

The purpose of this report is to present basic information for establishing a brass foundry in a foreign country to produce brass castings. While the information shown in this report is based on brass products, other materials such as copper, aluminum and nonferrous alloys may be cast. (Author)

PB-175 535/4 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Executive'S Role in an Organization.
1957, 82p Rept no. Training Manual-110
Prepared in cooperation with Industrial Development Center, Manila. Management Training Forum Services.

Keywords: Management engineering, Supervisory personnel, Organizations, Management planning, Management control systems, Leadership, Job analysis, Instruction manuals, *Management techniques.

Contents: Responsibilities of the executive; Company organization; Departmental organization; Planning; Directing; Coordinating; Controlling.

PB-175 537/0 PC A08/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Lumber Seasoning.
Edward C. Peck, and John M. McMillen. Jul 61, 165p
Prepared in cooperation with Forest Products Lab.

Keywords: *Wood, Aging(Materials), Deterioration, Shrinkage, Moisture, Drying, Manpower, Handling, Degradation, Heat, Insects, Air, Costs, Storage, Foundations(Structures), Structures, Tables, Safety.

The report deals with the seasoning of lumber, especially by comparatively simple means applicable throughout the entire world. Seasoning is important because the removal of moisture from green wood is generally necessary before the material can be safely stored or used to best advantage. For particular uses, drying to a low moisture content is required. While the main part of this report refers to methods and techniques of air drying and kiln drying lumber, such other phases are covered as basic properties of wood, principles of moisture removal, protection of green wood from attack by fungi and insects, and dry lumber storage.

PB-175 538/8 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Nylon Hosiery.
Oct 61, 33p
Prepared in cooperation with Textile Associates, Inc., Boston, Mass.

Keywords: Industrial production, Socks, Management engineering, Manufacturing methods, *Industrial plants, Site selection, Buildings, Power supplies, Fuels, Industrial equipment, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Commerce, Law, Machines, Management planning, Nylon, Management control systems, *Clothing, Nylon hosiery.

The purpose of this report is to present basic information for establishing a plant in a foreign country to produce women's full fashioned nylon hose from purchased nylon yarn. (Author)

PB-175 539/6 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Cotton Dresses.
Revised ed.
Apr 59, 40p

Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Keywords: Industrial production, *Clothing, Cotton textiles, Management engineering, Management control systems, Management planning, Manufacturing methods, *Industrial plants, Site selection, Buildings, Power supplies, Industrial equipment, Fuels, Labor, Personnel, Costs, Money, Budgets, Safety, Training, Law, Machines, Commerce.

The cotton dress industry is described as one of the most competitive manufacturing businesses in the United States. For this reason, a great amount of effort has been applied to making the processes as efficient as possible. Despite rising costs of materials and labor, high productivity makes it possible to produce stylish, simple dresses that retail in the United States for three to four dollars. Most of these are produced in small and medium-sized factories such as the one described in this manual. (Author)

PB-175 540/4 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Souvenirs and Small Jewelry.
Nov 56, 37p
Prepared in cooperation with H. D. Nottingham and Associates, Arlington, Va.

Keywords: Industrial production, Manufacturing methods, Industrial equipment, *Industrial plants, *Casting, Costs, Molding, Wood, *Foundries, Jewelry.

The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Three types of products have been considered. They are: conventional jewelry, ceramic souvenirs and jewelry and wooden souvenir products. Initial plant establishment may be any one of or combination of the three.

PB-175 541/2 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements to Set Up and Operate a Job Machine Shop.
May 61, 49p
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa.

Keywords: *Industrial plants, Machining, Industrial equipment, Industrial production, Management engineering, Maintenance, Costs, Machine shop practice, *Machine tools.

The purpose of this report is to present basic information for establishing and operating a job machine shop in a foreign country. The report includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial, and economic factors.

PB-175 542/0 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Fruit and Vegetable Juices.
Sep 62, 49p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Keywords: *Fruits, *Vegetables, *Beverages, Processing, *Industrial plants, Manufacturing methods, Quality control, Specifications, Industrial production, Preservation, Industrial equipment, Site selection, Power, Water, Fuels, Labor, Costs, Budgets, Economics, Industrial procurement.

Contents: General assumptions; Product specifications; Production capacity; Manufacturing unit; Definition and classification of juices; Fruits and vegetables from which juices can be produced; Production procedures; Nectars; Use of preservatives; Quality control; Direct materials; Supplies; Plant layout; Plant site; Buildings; Power; Water; Fuel; Production equipment; Other tools and equipment; Furniture and fixtures; Direct labor; Indirect labor; Depreciation; Manufacturing overhead; Manufacturing costs; Fixed assets; Working capital; Capital requirements; Sales revenue; Recapitulation of costs, sales and profits; Budget control; Budget control accounts; Purchase requisition; Economics; Plant and operational requirements; Manufacturers of food processing equipment and supplies.

PB-175 543/8 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements to Set Up and Operate a Wool Scouring Plant.
Mar 62, 48p
Prepared in cooperation with Thompson and Williams, Washington, D. C.

Keywords: *Fibers, *Industrial plants, Cleaning, Processing, Management engineering, Costs.

The purpose of this report is to present basic information relative to the establishment of a wool scouring (washing) plant in a foreign country. This plant will scour raw grease wool and bale the scoured wool on a commission basis. Charges for this service are applied on the grease wool weight and the owner accepts 50 to 60 per cent of the original weight in scoured wool free of most impurities. (Author)

PB-175 544/8 PC A03/MF A01
Agency for International Development, Washington, D. C. Communications Resources Div.
Plant Requirements for Manufacture of High Alumina Refractory Brick and Cement.
Jul 62, 42p
Prepared in cooperation with Hendryx (Dwight B.) and Associates, Inc., Pittsburgh, Pa.

Keywords: *Bricks, Manufacturing methods, *Industrial plants, , Machine tools, Cements, Budgets, Maintenance, Grinding, Milling machines, Storage, Industrial production, Specifications, Costs, Buildings, Power, Refractory materials, Alumina, Safety, Industrial procurement.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce high alumina refractory brick and cement. The aluminum oxide (Al_2O_3) content of high alumina refractory brick may range from 50 percent to about 99 percent, depending on the refractory requirements. An analysis is made of the machinery and equipment used to produce these high alumina refractory bricks. (Author)

PB-175 545/3 PC$6.00/MF$3.00
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements to Set Up and Operate a Seafood Processing Plant.
Sep 62, 50p
Prepared in cooperation with Fehmerling Associates, Bridgeton, N. J.

Keywords: Seafood, Processing, *Industrial plants, Specifications, Frozen foods, Quality control, Industrial equipment, Power, Water, Fuels, Labor, Costs, *Food processing, *Fishes.

The purpose of the report is to present methods and information for processing fish, langosta and shrimp in various forms, preserved by freezing. Preserving of certain species of fish by brining and drying is also briefly discussed.

PB-175 546/1 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Paint and Varnish Brushes.
May 69, 47p
Prepared in cooperation with Wolf Management Engineering Company, Chicago, Ill.

Keywords: Paint applicators, Industrial production, Manufacturing methods, Industrial equipment, *Industrial plants, Costs, *Paints, *Brushes.

The manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale factory of this type.

PB-175 547/9 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements to Set Up and Operate a Plant for Plating of Automobile Parts.
Oct 61, 72p
Prepared in cooperation with Vitro Engineering Co., Washington, D. C.

Keywords: *Plating, Industrial production, Metal coatings, Anodic coatings, Vehicle chassis components, Aluminum alloys, Steel, Brass, Zinc alloys, Electroplating, Industrial equipment, *Industrial plants, Costs.

The publication describes processing and plant requirements for applying: (1) Decorative chromium coatings to automobile hardware made of steel, brass, aluminum and zinc die-casting alloys; and (2) Anodic coatings, both clear and colored, to parts made of aluminum alloys. (Author)

PB-175 548/7 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Rough Sawing of Logs.
Oct 56, 65p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Keywords: *Wood, Industries, Trees, Saws, Costs, Machine tools, Labor, Efficiency, Commerce, Industrial equipment, Management planning, Personnel, Structures, Power, Specifications, Maintenance, Terrain, Wastes(Industrial), *Industrial plants.

The purpose of the report is to present basic information for establishing and operating a logging and sawmilling operation in any country where logging operations are considered feasible. The information includes general logging and sawmill methods, mill layout, machinery requirements, and the costs of materials, equipment, labor, and overhead expenses. (Author)

PB-175 549/5 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Hand-Made Blown Glass and Fine Cast Crystal.
Technical inquiry service.
Jan 60, 36p
Prepared in cooperation with Aries Associates, Inc., Stamford, Conn.

Keywords: *Glass, Material forming, Manufacturing methods, Castings, Furnaces, Industrial production, *Industrial plants, Management engineering, Costs.

The manufacture of glass products of artistic merit requires highly skilled and experienced artisans, not only for the design and execution of the finished articles, but for the formulation and manufacture of batches of fine glass and crystal of desired working properties and attractive color and lustre. This report emphasizes the process of making the glass batch itself, the plant and equipment required, and general procedures of furnace work and annealing, rather than the skilled techniques of blowing, pressing, cutting or engraving required to produce and decorate the finished article. The operation of the proposed plant consists essentially in the manufacture of batches of various types of glass, largely for inventory, and the working up of glass into finished articles in a sequence of operations, many of which proceed more or less independently of the glass manufacturing operation. (Author)

PB-175 550/3 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Wood Wastes.
Technical inquiry service.
Apr 58, 35p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill.

Keywords: Wood, Wastes(Industrial), Particles, Costs, Specifications, Industrial production, Machine tools, Industrial equipment, Disposal, Manufacturing methods, Cleaning, Absorption, Curing agents, Abrasives, Packing materials, Storage, Management engineering, *Wood wastes, *Industrial plants, *Waste recycling.

Contents: Economic consideration; Uses of sawdust; Wood flour; (definition and description, history, uses, industry production, wood species used, raw material requirements, manufacturing methods, manufacturing

systems, general comments on production equipment, protection of equipment, related business opportunities, selling prices, typical specifications, plant investment, production costs, operating statement and cost per ton).

PB-175 551/1 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Human Relations in Management.
Management primer.
1962, 68p Rept no. Training manual-93
Report on Principles and Practices of Productivity.

Keywords: Management engineering, Instruction manuals, Training devices, Production control, Wages, Personnel management, Labor, Supervision, Money, Public relations, Psychology, Employee relations, *Management techniques.

Contents: Human relations and organization; Improving human relations; Dealing with representatives of employee groups; Principles of supervision; Human relations and productivity. (Author)

PB-177 544/4 PC A11/MF A01
Stanford Research Inst., Menlo Park, CA.
Water, Mineral, and Forest Resources in Regional Economic Development.
Robert K. Arnold, Ernest C. Harvey, Genie E. Willeke, and Joseph E. R. Carrier. Sep 66, 235p
Contract C-300-66

Keywords: *Natural resources, United States, Economics, *Mineral products, *Forestry, Water, Organizations, Fiberboard, Atmospheric precipitation, Evaporation, Industries, Metals, *Water resources, Area planning and development, Regional economic development.

Extensive literature and numerous programs exist concerning the development of forest, mineral, and particularly, water resources in specific areas of the United States. Comparatively little of this work is directed specifically to the relation between development of resources and regional growth, much less to the specific programs and policies of a regional organization whose objectives are to maximize regional economic development. It is the purpose of the report to provide some guide by indicating the relevant sections of the literature. This is essentially a task of interpretation. The growth of income and employment in regions of the United States may be explained in terms of the location and growth of basic industries and their cumulative effect on other industries. Analysis of the future growth potential of any region may be viewed as the study of the future growth of individual industries, the factors that influence their location, and the interrelations among various industries. (Author)

PB-177 908/1 PC A08/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
The Role of Small-Scale Manufacturing in Economic Development. The Experience of Industrially Advanced Nations as a Guide for Newly Developing Areas.
Nov 57, 172p
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Keywords: Industries, Economics, Production, Growth, Training, Factories, Agriculture, Fishes, Commerce, Mobilization, Switzerland, Transportation, Textiles, Australia, USSR, United States, Japan, Sweden, Management engineering, *Industrial development, *Small businesses, Industrial management.

The manual is concerned with the appropriate structure of manufacturing in underindustrialized but developing countries. It is not concerned with the over-all process of economic growth. It assumes that some degree of industrialization will occur in underindustrialized societies and inquires only as to the proper balance between large-scale and small-scale manufacturing units. More specifically, it examines the proposition that economic growth may be retarded by overemphasis upon large-scale industrial operations. (Author)

PB-177 912/3 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Improved Productivity in the Factory. A Jobbing Machine Shop.
Feb 58, 31p
Prepared in cooperation with Methods Engineering Council, Pittsburgh, Pa., and Creative Arts Studio, Inc., Washington, D. C.

Keywords: Management planning, Manufacturing methods, Human engineering, Design, Production, Maintenance, *Machine tools, Machine shop practice, Safety, Quality control, Inventory control, Production control, *Management techniques.

This brochure outlines some of the important factory conditions which lead to low efficiency. Its purpose is to show how step-by-step remedial action may be taken to correct these conditions, and improve productivity with no major expenditure for new machinery or equipment.

PB-177 914/9 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Automobile Body Corrosion Prevention. Maintenance and Repair Procedure.
Jul 60, 29p

Keywords: Passenger vehicles, Corrosion inhibition, Cargo vehicles, Maintenance, Finishes and finishing, Epoxy plastics, Polyester plastics, Filling, Lead alloys, Specifications, *Automobiles, *Corrosion.

Contents: Introduction; Automobile body coatings; Failures of coatings and corrosion; Primary maintenance recommendations; Maintenance procedures; Suppliers; Tools and equipment used for repairs to metal automobile bodies; Bibliography of government specifications; Conclusion.

PB-177 915/6 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Men's Work Shirts. Capital Requirements, Techniques and Operations.
1961, 76p
Prepared in cooperation with Wolf Management Engineering Co., Chicago, Ill. A Reference for use in Planning New Industrial Facilities.

Keywords: *Clothing, Industrial production, Costs, *Industrial plants, Quality control, Management engineering, Standards, Manpower, Manufacturing methods, Employment, Production control, Industrial equipment.

The report is concerned with the inexpensive work shirt. Being a staple item of clothing and sold in great volume under highly competitive conditions, it must necessarily be produced efficiently, using the best methods and equipment, if the enterprise is to be successful. Fortunately, the processes are well defined and comparatively simple, and the machinery required is readily available at reasonable cost. The basic information and factual data required for consideration before engaging in the business are presented. (Author)

PB-177 916/4 PC A13/MF A01
International Cooperation Administration, Washington, D. C.
Papermaking and Manufacture of Paper Products as a Small-Scale, Semi-Mechanized and Cottage Industry. Materials--Processes--Equipment Organization--Economics--marketing.
J. Ben Lieberman. Jun 58, 291p
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif.

Keywords: Paper industry, Economics, *Paper, Manufacturing methods, Feasibility studies, Site selection, Industrial training, Natural resources, Organic materials, Materials, Agriculture, Test methods, Analysis, Sociology, China, Japan, *Industrial plants.

This Manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale papermaking industry. It should prove useful in creating interest in the subject, and serve to give enough understanding of the related considerations to help government officials, other leaders and entrepreneurs determine whether the potential deserves more-detailed attention. Also, special segments of the Manual may serve as separate manuals or references for specific phases of the subject.

PB-177 918/0 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Buckets, Pails and Pans.
Revised ed.
May 59, 38p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Containers, Industrial production, *Kitchen equipment and supplies, Manufacturing methods, *Industrial plants, Costs, Zinc coatings, Corrosion inhibition, Tin coatings, Costs, Labor, Industrial equipment, Personnel, Training.

Galvanizing is a process by which iron or steel is coated with zinc to render it rust-resistant. There are three general methods for accomplishing this. They are, (1) the hot - dip method; (2) the electro-galvanizing method; and (3) the 'Sherardizing' method. This manual describes the hot-dip method because it is the most widely used and because of its economic advantages over the other methods. The tinplating process is accomplished by the same basic method. The galvanizing process is used in the manufacture of buckets, pails, wash tubs, water tanks and many industrial products. It cannot be used in any product which comes in contact with food, however, because the zinc will contaminate the food. Tinplated products, on the other hand, are used extensively for food containers. There is very little tinplating done by the hot-dip method in the United States due to the high cost of tin. In fact, many manufacturers are using aluminum, stainless steel, and copper for cooking utensils instead of tinplate. In other parts of the world, however, tin would probably be cheaper than other applicable materials. (Author)

PB-177 919/8 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Ceramic Dinnerware.
Revised ed.
May 59, 41p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Kitchen equipment and supplies, Industrial production, Ceramic materials, *Industrial plants, Industrial equipment, Manufacturing methods, Costs, Labor, Commerce, Standards, Personnel, Training, Safety, *Ceramics, Dinnerware.

Dinnerware production in the United States ranges from very high production from highly mechanized factories to very small potteries which produce in small quantities. The smaller potteries generally depend on the unusual in design in marketing their ware, while the larger potteries rely heavily on competitive pricing. The products of the plant discussed in this report are those comprising a line of relatively heavy, serviceable, semi-vitreous dinnerware. A representative assortment of products consists of cups, saucers, 6-inch and 10-inch plates, salad bowls, and large serving bowls. (Author)

PB-177 921/4 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Men's Socks.
Revised ed.
May 59, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Socks, Industrial production, *Industrial plants, Costs, Labor, Industrial equipment, Dyes, Budgets, Manufacturing methods, Training, Personnel, *Clothing.

The purpose of this manual is to present basic information for establishing and operating a small plant for the manufacture of men's socks. Except for a small percentage all socks are made by the knitting process. There are about 4,000 knitting industries in the United States. A few of the products made in these industries include outerwear, underwear and hosiery. However, this manual will be devoted exclusively to men's socks. The term sock used in this manual denotes a short stocking as distinguished from a hose that is longer. (Author)

PB-177 922/2 PC A03/MF A01
Agency for International Development, Washington, D. C. Communications Resources Div.
Plant Requirements to Set Up and Operate a Plastic Molding Plant.
Revised ed.
Apr 59, 49p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Plastics, Industrial production, Plastics industry, *Industrial plants, Industrial equipment, Manufacturing methods, Molding, Dies, Labor, Costs.

It is assumed, for this prospectus, that the market for the products of any plastic molding plant which might be established will be primarily non-industrial. It is also assumed that a hypothetical plan, if sound from the point of view of both economics and technical considerations, would be helpful. Accordingly, such a plan with the capital requirements limited to approximately $240,000 is presented. (Author)

PB-177 923/0 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Sanitary Ware.
Revised ed.
May 59, 39p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Keywords: Toilet facilities, Industrial production, Ceramic coatings, Industrial equipment, *Industrial plants, *Sanitaryware, *Foundries, Manufacturing methods, Iron, *Casting, Costs, Labor, Standards.

The process of enameling cast iron sanitary ware imparts a hard, glossy surface to the object. This coating permits easy cleaning and presents a pleasing appearance. It is stain resistant, highly acid resistant, and, if properly applied and given reasonable care in usage, will last almost indefinitely. The type of plant described in this report is one which could be set up in almost any part of the world. The basic raw materials -- pig iron, scrap iron, and sand -- are ordinarily obtainable in all parts of the world. Where special skills would be required for the production of the ware, modern machinery has been substituted wherever feasible. In this way, the operation can be started more readily and quality standards can be reached sooner. (Author)

PB-177 924/8 PC E99/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Terry Cloth.
Revised ed.
May 59, 37
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Keywords: Textiles, Industrial production, Labor, Costs, Industrial equipment, *Clothing, *Textile industry, *Industrial plants, Manufacturing methods, Cotton, Terry cloth.

Terry cloth is cotton fabric covered with loops on one or both sides. It requires two sets of warps and one set of filling; one set of warp threads is held taut while weaving, the other set is released to form the loops. When woven in linen (rare) or bleached cotton in narrow widths, terry cloth is called 'Turkish toweling.' This usually has two loops (called double-loop terry). It can also be made in checks, stripes, or plaid, or bleached and dyed. Uses include towels, wash cloths, robes, bath mats, bathing suits or sunsuits, linings for suits and coats, draperies, spreads, bedrolls, and potholders. Terry cloth readily absorbs and retains moisture, making it suitable for use as wash cloths and toweling. It is used in some applications because of its efficiency as an insulating medium and because it is readily washed when soiled. Due to the fact that the applications of single-loop terry cloth are numerous and in good volume, the discussion is concerned with the production of cloth of that type in a mill of minimum economic size. (Author)

PB-177 925/5 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Wood Tables and Chairs.
Revised ed.
May 59, 46p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Keywords: *Kitchen equipment and supplies, Industrial production, Wood, Manufacturing methods, *Industrial plants, *Furniture, *Wood products, Industrial equipment, Costs, Labor, Tables and chairs.

The purpose of this manual is to provide information for the establishment and operation of a small plant to manufacture low cost wooden tables and chairs. The table and chairs shown in this manual are designed for low cost production and are not intended for the luxury market. Local customs might require some change in the designs. However, design changes that will add substantially to the cost of the product should be avoided. (Author)

PB-177 926/3 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements to Set Up and Operate a Meat Processing Plant.
Revised ed.
May 59, 54p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Meat, Processing, *Industrial plants, Industrial equipment, Personnel, Production control, Labor, Costs, *Food processing.

The purpose of this manual is to provide information about the establishment and operation of a small meat processing plant. The manual provides a description of the slaughtering and of the processing of meat products as these activities might be carried out in a small plant in United tates. It includes a description of the plant layout, equipment and personnel and estimates of investment, operating costs and revenues. Local situations might make some changes desirable but the plant described is satisfactory for a considerable variation in materials and methods of processing and product without serious modification of the design and operation. (Author)

PB-177 927/1 PC A03/MF A01
International Cooperation Administration, Washington, D. C.
Plant Requirements for Manufacture of Worsted Yarns.
Sep 61, 35p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Fibers, Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Costs, Labor, Training, *Clothing, *Textile industry, *Yarns.

No abstract available.

PB-177 928/9 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements to Set Up and Operate a Dry Cleaning Plant.
Sep 57, 47p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Industrial plants, Cleaning, Textiles, Cleaning compounds, Solvents, Industrial equipment, Costs, *Clothing, Driers(Apparatus), Presses(Machinery), Packaging, Safety, Dry cleaning.

The small dry cleaning plant described in this brochure is intended to clean and finish all types of clothing, bedding, draperies and many other kinds of household textile articles. Dry cleaning textile articles generally is done by washing them in petroleum solvent, such as benzine, or in synthetic solvent, such as perchlorethylene. The equipment for one of these processes cannot be used for the other process. The dry cleaning process carried out in a synthetic-solvent plant using perchlorethylene is described in this brochure. (Author)

PB-177 929/7 PC A03/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Plant Requirements for Manufacture of Flush Doors.
Sep 67, 34p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Doors, Industrial production, Wood, Manufacturing methods, *Industrial plants, *Wood products, Industrial equipment, Specifications, Labor, Costs.

The equipment and operating procedures described in this brochure are intended for the production of flush doors as an addition to, or the expansion of, an existing woodworking plant, where there is sufficient demand for these products and where such a local operation would be practicable. The equipment and methods shown in this brochure are modern and capable of making all grades of flush doors, both interior and exterior, up to 3 feet wide and 7 feet long. (Author)

PB-177 930/5 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Plywood.
Sep 57, 45p
Prepared in cooperation with Andrews (George H) Engineering Associates, Inc., Washington, D. C.

Keywords: Plywood, Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Storage, Handling, *Wood, Processing, Labor, Costs.

The small plywood plant described in this brochure is intended to manufacture plywood panels in a foreign country, where there is sufficient demand for these products and where such a local operation would be practicable. The machinery, equipment and methods shown in this brochure are modern and capable of making all grades of veneer and plywood, including marine plywood. The plant will operate equally well with either hard or soft wood. (Author)

PB-177 931/3 PC A02/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Porcelain Enamelware.
Apr 56, 20p
Prepared in cooperation with Penniman and Browne, Baltimore, Md.

Keywords: *Kitchen equipment and supplies, Industrial production, Cooking devices, Manufacturing methods, Processing, Industrial equipment, *Industrial plants, Costs, *Porcelain.

Contents: Manufacturing operations; Plant requirements; Suggested sources of supply for raw materials and processing equipment; Illustration; Supplementary data; Sources of information.

PB-177 932/1 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Asbestos - Cement Pipe.
Jun 60, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Pipes(Tubes), Industrial production, *Asbestos, Cements, Manufacturing methods, *Industrial plants, Industrial equipment, Costs, Labor.

As indicated by the name, asbestos-cement pipe is made of asbestos fibre and Portland cement, usually in combination with some other material like silica. A curing agent may also be added but this is not always necessary. In the United States the market for asbestos-cement pipe is large and growing steadily. This favorable situation has grown from the fact that these products meet many of the needs for pipe with the physical characteristics of asbestos-cement products. They are inexpensive and with unusual resistance to various corrosive fluids found in many pipe systems. Asbestos does not burn and is a very poor conductor of electricity. (Author)

PB-177 933/9 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Soybean Oil and Meal.
Sep 61, 62p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Vegetable oils, Processing, *Industrial plants, Industrial equipment, Phospholipids, Food, *Food products, Glycerols, Acids, Yeasts, Colloids, Paints, Insecticides, Purification, Labor, Costs, *Soybeans.

Soya beans, which are native to eastern Asia, are now grown extensively in all parts of the world. They thrive best in the temperate zone. The uses for the end product are many, at latest count numbering some 150 separate applications. The principal uses of the expelled crude soya oil include seven basic categories: (1) Technical refined oils; (2) Edible refined oils; (3) Edible lecithin; (4) Technical lecithin; (5) Medicinal lecithin; (6) Glycerine; (7) Acids. (Author)

PB-177 934/7 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Chalk Whiting.
Sep 61, 36p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Mineral products, Industrial production, Limestone, Material separation, Particle size, Manufacturing methods, *Industrial plants, Industrial equipment, Labor, Costs, Chalk whiting.

The report is primarily concerned with the absolute minimum operation for manufacture of true chalk whiting and, therefore, discusses the simplest manufacturing processes utilizing the crushing, grinding, and screening of high purity chalk. However, sources of raw material for the manufacture of true whiting are limited. This, and many other factors have led to the development of whiting substitutes with their alternate methods of manufacture and production. The CaCO3 chemical industry that has grown up in the United States in recent years is an outstanding example of such a development. Before presenting the detailed description of the manufacture of true chalk whiting, sufficient information on whiting substitutes is included to present a basic concept of methods for their production and to offer to present a basic concept of methods for their production and to offer sources of information for further study of operations that may be adaptable to any locale and its available raw materials. (Author)

PB-177 935/4 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Stretch Socks for Men and Children.
Sep 61, 34p
Prepared in cooperation with Andrews (George H.) Associates, Inc., Washington, D. C.

Keywords: Socks, Industrial production, Manufacturing methods, Textile industry, *Industrial plants, Industrial equipment, Dyes, Labor, Costs, *Clothing.

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce stretch socks for men and children. Such a manufacturing plant is generally known as a knitting mill. (Author)

PB-177 936/2 PC A04/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Cement.
Dec 61, 58p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Cement, Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Processing, Construction materials, Production control, Labor, Costs.

No abstract available.

PB-177 937/0 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Ready-Mixed Concrete.
Mar 62, 31p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Concrete, Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Labor, Costs.

The purpose of this report is to present basic information for establishing a manufacturing plant in a foreign country to produce dry ready-mixed concrete in paper bags. Dry ready-mixed concrete is made of various mixtures of cement and aggregates and these mixtures are called by various names such as 'dry mix cement,' 'Ready mixed concrete' and 'ready mixed cement.' Some of the names used are trade names, such as 'homecrete' and 'sackcrete.' Some of these may include additives or admixtures that are intended to produce certain desirable qualities in the final product. For the purposes of this report the product is called ready-mixed concrete. This product is made up of cement, sand and gravel, without any special additives. This ready-mixed concrete is intended for use by homeowners and others who need only a small amount of concrete at any one time and who cannot, therefore, buy the cement, the sand and the gravel separately, to their advantage. The ready-mixed concrete is kept on hand in retail hardware stores, paint stores, lumber yards, and building supply places. Thus it always will be convenient for any homeowner or other possible user who may wish to purchase small quantities for immediate use. (Author)

PB-177 938/8 PC A02/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Brooms.
May 57, 14p
Prepared in cooperation with Thompson and Williams, Washington, D. C.

Keywords: Industrial production, Maintenance equipment, Costs, Buildings, Wages, Materials, Manpower, Quality control, Manufacturing methods, Industrial equipment, *Industrial plants, *Brooms.

The manufacture of brooms offers a profitable business opportunity adaptable to broad variation in initial investment required, locale, raw materials, labor requirements, climate, and market conditions. Existing buildings may in many cases be adapted to house a modern broom factory with little or no alteration. The principal requirements are adequate floor space, a source of power, and ventilation. Fireproof buildings are desirable especially for warehousing space since fire insurance rates in many locations are high for any operation involving combustible materials. (Author)

PB-177 939/6 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Mechanical Springs.
Revised ed.
Jul 62, 48p
Prepared in cooperation with Vitron Engineering Co., Washington, D. C.

Keywords: *Springs, Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Production control, Specifications, Machining, Labor, Costs.

The purpose of this report is to present basic information relative to the establishment of a plant to manufacture mechanical springs in a foreign country. Springs may be produced in a wide variety of shape, such as coiled, spiral, flat, leaf, ring, and numerous special shapes. They may be of various types, depending upon their intended use, such as tension, compression, torsion, extension, cantilever, etc. The ends may be formed to most any shape desired, such as tightly coiled, looped, squared, hooked, open, etc. A plant may manufacture only stock type springs for general purpose use, or it may manufacture a wide variety of shapes, types, and sizes to a customer's individual specifications. The plant described herein has been planned and equipped to produce initially the six general groups of spring products listed under 'Product Specifications.' This production can be varied to suit local conditions. A plant of this type will require a substantial capital investment and a relatively skilled labor force. Obviously, an economically underdeveloped country could not profitably support a plant of this type, as a market for spring products will not exist until general industrial development is quite advanced. However, in a suitable environment, a plant such as this can realize substantial profits with efficient management, production controls, and sales effort. (Author)

PB-177 940/4 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Wallboard from Gypsum and Fiber.
Dec 62, 33p
Prepared in cooperation with Andrews (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: *Fiberboard, Industrial production, Panels(Structural), *Gypsum, Fibers(Natural), Manufacturing methods, *Industrial plants, Industrial equipment, Labor, Costs, *Fibers.

The purpose of this report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce wallboard from gypsum and coconut husk fibers. (Author)

PB-177 943/8 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Mayonnaise.
Technical inquiry service.
1 May 59, 29p
Prepared in cooperation with Snell (Foster D.) Inc., New York.

Keywords: Food, Processing, Colloids, Costs, Production, Industrial equipment, *Industrial plants, Packaging, Sanitary engineering, *Food products, Mayonnaise.

The report covers the procedures, plant equipment, and economics involved in the manufacture of 250,000 pounds of mayonnaise per year. Two manufacturing procedures are covered: (1) Batch mixing or beating; (2) Continuous emulsification or homogenization. Economics of operation for each process are shown for investment comparisons, and include lists of equipment required, labor, utility, and material balances. Formulas for several types of commercial mayonnaise are given. (Author)

PB-177 944/6 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
A Small Particle Board Plant.
Technical inquiry service.
Jun 59, 35p
Prepared in cooperation with Andrew (George H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Panels(Structural), Industrial production, Manufacturing methods, *Industrial plants, Industrial equipment, Production control, Labor, Costs, *Particle board.

The purpose of this report is to present basic information for establishing and operating a small particle board plant in a foreign country. The plant is designed to produce about 120 boards per hour. Based on current practice in the United States, this is a small plant. The recommended equipment and production methods are modern and have proven profitable when operating under conditions comparable to those assumed. (Author)

PB-177 945/3 PC A03/MF A01
International Cooperation Administration Washington, D. C. Office of Industrial Resources.
Aluminum Door and Window Sash.
Technical inquiry service.
Nov 59, 46p
Prepared in cooperation with Lederer (A. M.) and Co., Inc., New York.

Keywords: Structural parts, *Aluminum, Costs, Manpower, Extrusion, Assembling, Site selection, Manufacturing methods, Industrial equipment, Doors, Indus-

trial production, *Buildings, *Industrial plants, Inventory control, Training, Safety, Sashes(Structural), Windows.

Aluminum is used in place of or along with wood and other forms of building materials in the manufacture of window and door sash in residential, commercial, and manufacturing structures. Aluminum sash doors and windows are generally made of extruded aluminum sections, glass, aluminum mesh screens, neoprene vinyl, and stainless steel. A wide variety of designs and sizes is manufactured depending upon the use to which the units are to be put. (Author)

PB-177 946/1 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Silk Screen Printing on Textiles.
Technical inquiry service.
Jul 60, 41p
Prepared in cooperation with Mayer (Frank) Engineering Co., Los Angeles, Calif.

Keywords: Textiles, Printing, *Clothing, Fibers(Natural), Fibers(Synthetic), Dyes, Costs, Labor, Industrial equipment, Colors, *Industrial plants.

Silk screen printing varies in complexity from a simple operation to a highly scientific art. If confined to the use of pigmented dyes, a satisfactory product can be produced for cottage industry with a minimum of equipment and without the need of highly trained and skilled color chemists and special equipment for dye setting and aging. It is basically a service industry since no product is produced; instead printing is done to supply the needs of other manufacturers for decoration of their products. One thousand to twelve hundred yards of material can be printed on five tables by six people oin one eight-hour shift. (Author)

PB-177 943/7 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Lubrication Fundamentals and Practices. Sessions I, II, and III.
Apr 57, 91p Rept no. Technical Bull-43
Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa. See also Session 4, 5, 6 and 7, PB-177 949.

Keywords: *Lubrication, Instruction manuals, Greases, Oils, Protection, Bearings, Viscosity, Friction, Specifications, Gears, Industrial equipment, Handling, Storage.

Contents: Principles of lubrication; Characteristics of lubricants; Methods of applying lubricants; Gears and their lubrication; General bearings, electric motors and their lubrication; Lubrication of plant equipment; and Lubrication department operation.

PB-177 949/5 PC A07/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Lubrication Fundamentals and Practices. Sessions IV, V, VI and VII.
Apr 57, 137p Rept no. Technical Bull-44
See also Sessions 1, 2, and 3, PB-177 948. Prepared in cooperation with Armstrong Cork Co., Lancaster, Pa.

Keywords: *Lubrication, Instruction manuals, Gears, Bearings, Electric motors, Friction, Industrial equipment, Lubricants, Handling, Storage.

Contents: Gears and their lubrication; Lubrication of general bearings and electric motors; Lubrication of plants equipment; Lubrication department operation.

PB-177 955/2 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Department Store Merchandising.
1961, 79p Rept no. Technical Bull-63

Keywords: Management engineering, *Management techniques, *Marketing, Instruction manuals, Money, Costs, Organizations, Operation, Commerce, Personnel management, Management planning, Merchandising.

The manual provides eight sessions on the subject of Retail Merchandising or Store Management. The training course in 'Retail Merchandising' is directed to the specific purpose of training people in the best methods and procedures in the conduct of a small retail or department store. The material for the conduct of this course is, more or less, in outline form.

PB-177 956/0 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Retail Selling.
George H. Andrews. 1961, 73p Rept no. Technical Bull-65
Prepared in cooperation with Engineering Associates, Inc., Washington, D. C.

Keywords: Management engineering, Instruction manuals, Costs, Money, Training, Personnel management, Commerce, Management planning, *Management techniques, *Marketing.

The manual provides nine sessions on the subject of 'Retail Selling.' The training course in 'Retail Selling' is directed to the specific purpose of training people in the best methods and procedures in the conduct of a small retail store.

PB-177 962/8 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer. Principles and Practices of Productivity. Personnel Administration.
1962, 73p Rept no. Training manual-94

Keywords: Management engineering, Instruction manuals, Personnel management, Instruction manuals, *Management techniques, Employment, Job analysis, Wages, Employee relations, Motivation, Organizations, Personnel, Training, Records.

Contents: Selection and Hiring of Employees; Compensation of Employees and Job Rating; Employee Training; Training of Supervisors; Employee Relations; Personnel Records.

PB-177 963/6 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer. Principles and Practices of Productivity. Controls and Supervision.
1962, 62p Rept no. Training manual-95

Keywords: Management engineering, Instruction manuals, Supervision, Management control systems, *Management techniques, Personnel management, Quality control, Records, Money, Supervisory personnel, Training, Production control, Inventory control, Costs.

Contents: Planning for control; Setting up control procedure; Controls as money savers; The supervisor and supervision; The supervisor as an organ of control; Visual controls in supervision.

PB-177 964/4 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer. Principles and Practices of Productivity. Procurement and Inventory.
1962, 59p Rept no. Training manual-98

Keywords: Management engineering, *Management techniques, Instruction manuals, Inventory control, Management planning, Management control systems, Procurement, Costs, Organizations, Inventory, Contracts, Stock level control, Storage, Quality control, Budgets.

Contents: Five principles of good procurement; The practice of procurement; Sound procurement policy; Centralized procurement; Organization for procurement; The procurement contract; The question: Make or buy; Procurement and inventory; The role of inventory in an enterprise; The problems of inventory management; The aims of inventory management; The administration of inventory; Budgeting for inventory; The role of receiving in inventory management; The management of storage.

PB-177 965/1 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer. Principles and Practices of Productivity. Distribution and Sales.
1962, 70p Rept no. Training manual-100

Keywords: Management engineering, *Management techniques, *Marketing, Instruction manuals, Commerce, Consumption, Distribution(Economics), Costs, Management planning, Production.

Contents: The place of sales in business management; The consumer and competition; Market research and sales forecasting; Merchandising; Pricing policy; Service; Advertising; and Sales management.

PB-177 966/9 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer. Principles and Practices of Productivity. Research and Public Relations.
1962, 95p Rept no. Training manual-101

Keywords: Management engineering, *Management techniques, Instruction manuals, Commerce, Public relations, Production, Problem solving, Industrial psychology.

No abstract available.

PB-177 967/7 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Sales Promotion Methods.
George H. Andrews. 1962, 66p Rept no. Training Manual-103
Prepared in cooperation with Andrews Engineering Associates, Inc., Washington, D. C.

Keywords: Management engineering, *Management techniques, *Marketing, Commerce, Catalogs, Display systems, Public relations, Management planning, Professional personnel, Instruction manuals, Sales promotion, Salesmen.

Contents: What is sales promotion; The scope of sales promotion; A salesman's tools; Window and interior displays; Direct mail advertising; Catalogs and price lists; Advertising specialties, premiums, and contents; and Coordination - key to successful sales promotion.

PB-177 971/9 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Marketing Research.
1962, 85p Rept no. Training manual-117
Prepared in cooperation with Andrews (G. H.) Engineering Associates, Inc., Washington, D. C.

Keywords: Commerce, *Management techniques, *Marketing, Training, Analysis, Scientific research, Economics, Research program administration, Instruction manuals, Marketing research.

Contents: Basis of marketing research; Types of marketing research; Basic procedures and methods of marketing research; Situation analysis and informal investigation; Planning and preparing for the final research; Collection, tabulation, and analysis of data; Interpretation and presentation of data follow-up; General review - case studies.

PB-177 972/7 PC A06/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Leather Chemistry for Foremen. First Year Course.
1962, 121p Rept no. Training Manual-119
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass, and Lowell Technological Institute, Mass.

Keywords: *Leather, Chemical engineering, Atoms, Molecules, Symbols, Chemical reactions, Metals, Solutions, Ionization, Atomic structure, Hydrocarbons, Methane, Alcohols, Aldehydes, Ketones, Acids, Esters, Fatty acids, Waxes, Amines, Carbohydrates, Aromatic compounds, Halogen compounds, Dyes, Processing, Molecular structure.

Contents: Atoms and molecules; Symbols and formulas; Some non-metallic elements; Chemical reactions; Chemical arithmetic; Metals; Solutions; Ionization; Atomic structure; Introduction - structural theory; Hy-

drocarbons and methane series; Alcohols; Aldehydes, ketones, acids, esters; Fats, oils and waxes; Amines; Carbohydrates; Aromatic amines; Halogen compounds; and Dyes and dyeing.

PB-177 973/5 PC A06/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Leather Chemistry for Foremen. Second Year Course.
Albert E. Chouinard. 1962, 121p Rept no. Training Manual-120
Prepared in cooperation with Lowell Technological Institute, Mass., and Lawrence (A. C.) Leather Co., Peabody, Mass.

Keywords: *Leather, Chemical engineering, Hair, Skin, Proteins, Enzymes, Bacteria, Pickling, Quantitative analysis, Hydrolysis, PH, Oxidation-reduction reactions, Chromium, Tanning, Dyes, Coatings, Neutralization, Colloids.

Contents: Skin structure; Protein chemistry and soaking; Liming; Unhairing; Conditioning effects in liming; Enzymes, bacteria and bating; Bating; Pickling; Quantitative analysis; Hydrolysis equilibria; PH and oxidation reduction; Decreasing; Chromium - The werner co-ordination theory; Chrome complexes and olation; Chrome liquors; Two-bath process and neutralization; Chrome tanning theories - emulsions; Fatliquoring - stuffing and emulsions; Emulsion theories; Surface chemistry; Dyeing and coloring; Protective and decorative coatings.

PB-177 974/3 PC A04/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Leather Chemistry for Foremen. Third Year Course.
Albert E. Chouinard. 1962, 53p Rept no. Training Manual-121
Prepared in cooperation with Lawrence (A. C.) Leather Co., Peabody, Mass., and Lowell Technological Inst., Mass.

Keywords: *Leather, Chemical engineering, Instruction manuals, Solutions, Standards, Volumetric analysis, Chemical indicators, Chromates, Tanning, Histology, Histological techniques, Dyes, Colors, Finishes and finishing, Processing.

Contents: Weighing-- Measuring - standard solutions; Standard solutions; pH measurements and indicators; Volumetric analysis; Water analysis; Determination of hide substance; Determination of chromic oxide in leather; Analysis of leather; Analysis of vegetable tanning materials; Histology - the study of tissues, the microscope, the technique of slide making, special tests in leather microscopy; Beam house operations; Tanning; Retanning; Dyeing and fatliquoring; Formulation of three brown colors; Finishing.

PB-177 981/8 PC A05/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Leather Technology.
1962, 86p Rept no. Training Manual-140

Keywords: *Leather, Processing, Instruction manuals, Tanning, Dyes, Lubrication, Skin, Curing agents, Colors, Costs.

Contents: Introduction; Hides and skins; Soaking and unhairing; Liming, beaming and splitting; Acids and alkalies and the pH system of measuring their strength; Tanning; Vegetable tanning; Leather lubrication; Drying and pasting; Dyes and coloring; Economics in the leather industry; Workshop on upper leather; Leather machinery terms.

PB-178 062/6 PC A03/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Plant Requirements for Manufacture of Pharmaceutical Products.
Sep 61, 50p

Keywords: Management planning, Pharmacology, Manufacturing methods, Instruction manuals, *Drugs, *Industrial plants, Budgets, Safety, Costs, Money, Personnel, Training, Law, Site selection, Production, Manpower, Economics, Machines.

The purpose of this report is to present basic information for establishing a plant in a foreign country to produce pharmaceutical products. The term pharmaceutical products includes tablets; pills, coated and uncoated; and capsules. (Author)

PB-178 063/4 PC A05/MF A01
International Cooperation Administration, Washington, D. C. Office of Industrial Resources.
Training Course in Marketing.
Mar 60, 97p Rept no. Technical Bull-61

Keywords: Management planning, Instruction manuals, Commerce, Training, Time, Distribution, Storage, Handling, Money, *Management training, *Marketing, Advertising.

Contents: Introduction - important parts of marketing; Marketing research; Pricing policies; Advertising; Channels of distribution; Selling; Storage and warehousing; and Payment.

PB-178 064/2 PC A04/MF A01
International Cooperation Administration, Washington, D. C. Technical Aids Branch.
Management Primer: Principles and Practices of Productivity - Records and Reports.
May 62, 53p Rept no. Training manual-96

Keywords: Management planning, Reports, Instruction manuals, *Management techniques, Reports, Public opinion, Accuracy, Standardization, Classification, Manpower, Law, Records, Handling, Production, Costs, Money, Accounting.

Written records are the memory of management. They preserve facts and figures by setting them down in writing for future use. Without records and the experience they preserve there would be no scientific management today. Recorded experience helps management in the planning and scheduling of its operations. By comparing recorded performance with planned performance supervisors can control the progress of enterprise activities. And, by using records to obtain detailed information on all enterprise developments, businessmen can base their decisions on experience and thus reduce the risks of misjudging enterprise strength. Records also protect management against legal difficulties, because they create and preserve evidence on internal and external transactions that may be questioned by the public, by government, by the courts, or by other enterprises. (Author)

PB-178 341T PC A02/MF A01
National Tillage Machinery Lab., Auburn, Ala.
Investigation of Active Working Tools of Subsoil Irrigation Machines.
V. P. Chalyi, and V. S. Burd. 28 Apr 68, 4p
Trans. of Traktory i Selkhozmashiny (USSR) n9 p30-1 1966, by William R. Gill.

Keywords: Earth-handling equipment, Irrigation systems, Agriculture, Rural areas, *USSR, Water, Soil mechanics, Tractors, *Irrigation, *Agricultural machinery, Graphs(Charts), Translations.

Subsoil irrigation differs from the conventional method of irrigation in that water, together with fertilizers and chemicals., is introduced directly in the subsoil horizon with the help of a special tool. The working tool forms a fluctuating shaped mole cavity at a depth of 20-35 cm. Great depth of covering water by the accepted line of machines (4-6 rows) and the loosening of the compact subsoil horizon creates difficulty in matching subsoil irrigation machines with the manufactured lines of cultivator tractors because of inadequate tractive power. Therefore decreasing the tractive resistance of the working tool is a real problem. Proceeding from this it is expedient to use active working tools in subsoil irrigation machines. (Author)

PB-178 347T PC A03/MF A01
National Tillage Machinery Lab., Auburn, Ala.
The Problem of Basic Parameters of Tillage Tools for Primary Soil Tillage, Chapter II.
A. T. Vaginym. 10 Mar 68, 45p
Trans. of mono. Voprosy Selskhozyaistvennoi Mekhaniki, Minsk, 1967 p57-98, by William R. Gill.

Keywords: Earth handling equipment, Agriculture, Rural areas, Tractors, *USSR, Mathematical analysis, Shear stresses, Soil mechanics, Tables, *Agricultural machinery, Plowshares, Graphs(Charts), Translation.

There are six basic systems interactions of the operating tools of plowshare type plows with the soil: The action of one body alone without supplementary working tools; The operation of the basic body in conjunction with a skim coulter; The operation of the basic body with a stationary jointer stripping the upper field corner of the slice; The operation of the basic body with supplementary working tools decreasing the bottom furrow angle; Two-level plowing; and Three-level plowing. (Author)

PB-178 373T PC A02/MF A01
National Tillage Machinery Lab., Auburn, Ala.
Determination of the Optimum Parameters of Rotary Tiller Cultivation Equipment.
V. S. Surilov. 3 May 68, 13p
Trans. of Vsesoyuznyi Nauchno-Issledovatelskii Institut Mekhanizatsii Selskogo Khozyaistva, Moscow. Sibirskii Filial. Nauchnye Trudy (USSR) n3 p185-94 1966, by William R. Gill.

Keywords: Earth-handling equipment, Agriculture, Rural areas, Costs, Cost effectiveness, Economics, Tractors, Mathematical analysis, *USSR, Soil mechanics, *Agricultural machinery, Graphs(Charts), Rotary tillers, Translations.

The effectiveness of agricultural machines and tools depends on the extent their parameters suitably characterize the technological process of the worked media and the conditions of employment of a given machine. The basic parameters of rotary tiller row crop cultivators are: the width of cut B, forward speed V, and feed to the knife S. To supplement the parameters of the equipment we also take the mechanical efficiency and the coefficient of resistance to movement. The important qualities of the machine depend on the basic parameters of the equipment: the specific productivity, the specific cost, agrotechnical level of the treatment. (Author)

PB-179 327/2 PC A08/MF A01
Texas Transportation Inst., College Station.
Handbook for Building Homes of Earth.
Lyle A. Wolfskill, Wayne A. Dunlap, and Bob M. Gallaway. 1968, 160p* Rept no. Bull-21
Prepared in cooperation with Housing and Home Finance Agency, Washington, DC.

Keywords: *Housing, Soils, *Soils, Construction, Handbooks, Stabilization, Earth-handling equipment, Foundations(Structures), Walls, Compacting, Compressive properties, Tensile properties, Floors, *Adobe, Roof.

Contents: Introduction-types of earth houses; Soils and what can be done with them; Soil stabilizers; Site preparation; Foundations; Lightweight roofs; Getting the soil prepared; Making adobe blocks; Making pressed earth blocks; Making walls of pressed blocks; Making walls of rammed earth; Roofs for earth houses; Floors for earth houses; and Surface coatings.

PB-179 359/5 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC.
Urban Planning in Developing Countries.
Ideas and Methods Exchange No. 61
Lloyd Rodwin. 1968, 68p

Keywords: *Urban planning, *Venezuela, Management planning, Urban areas, Housing, Population, Transportation, Industries, Site selection, Terrain, Control, Natural resources, Petroleum, Roads, Buildings, Economics, Ciudad Guyana(Venezuela).

The study describes the job of the city planner in developing countries. It does this by examining a single case, the planning of Ciudad Guayana, a city being built in Venezuela, and it looks at this city planning endeavor from two points of view. It examines this still on-going enterprise from the standpoint of urban planning technique - how does the urban planner in such a setting do his work. - and in addition, it tries to suggest something of the functions which such an urban planning enterprise may have in a developing country. For while certain features of the case described are characteristic only of Venezuela, or of the problems of new cities, many of the problems confronted and tech-

niques used are relevant to urban, regional and national programs throughout the world. (Author)

PB-179 361/1 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Plant Requirements for Manufacture of Building Bricks.
Jun 67, 34p

Keywords: *Bricks, Manufacturing methods, *Industrial plants, Costs, Labor, Specifications, Machine tools, Site selection, Buildings, Money, Budgets, Industrial production, Clay, Shale, Mud, Driers(Apparatus), Inventory, Economics, Tropical regions, Area planning aid development.

The purpose of this report is to present basic information for establishing and operating a building brick plant in a country with a tropical or semi-tropical climate. The information includes general manufacturing methods, plant layout, and costs of materials, equipment, and labor. The plant described is considered to be the economic minimum in size which utilize suitable equipment and methods. Products are to be simple and varieties limited in order that costs may be kept to a minimum. (Author)

PB-179 362/9 PC A03/MF A01
Agency for International Development, Washington, DC.
Leader Training for Aided Self-Help Housing.
Keith H. Hinchcliff. May 63, 40p

Keywords: *Housing, Construction, Leadership, *Training, Management planning, Training, Design, Teaching methods, Motivation, Indonesia, Buildings, Roads, Costs, Construction materials, Foundations(Structures), Industrial training, Heat, Site selection, Area planning and development, Self-help housing, Community action programs.

More than half of the world's families live in totally inadequate dwellings. This contributes to ill health, low productivity, inertia, and unrest. In highly industrialized countries where a home is usually built by contractor-builders and where the family pays for having the house built for them, it is found that the cost for good shelter is, for many, too high. In areas where industrialization is just beginning and where most houses are built by the families themselves the result is often an unsanitary, short-lived, vermin-ridden hut. Neither of these techniques is the answer for many of the world's ill-housed. A technique which offers much promise is called 'aided self-help' and as its name implies, it is a method to use the unused leisure time of the ill-housed families (often enforced leisure because of seasonal unemployment) and to use this with some form of aid so that the families may build better homes than they ever could, alone and unaided. This manuscript outlines how effective leaders may be trained. The methods suggested by the author based upon considerable experience in Indonesia may, we believe, be effectively used by those who are attempting to introduce the principle of aided self-help in housing. (Author)

PB-179 363/7 PC A02/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Housing in Liberia.
Jun 67, 20p*
Country Report Series.

Keywords: Economics, Africa, *Housing, Africa, Geography, Climatology, History, Political science, Population, Agriculture, Mining engineering, Transportation, Communication systems, Commerce, Construction materials, Labor, Professional personnel, Urban planning, Rural areas, Law, Banking, Costs, Foreign aid, Statistical data, *Liberia, Area planning and development.

The report on housing in Liberia is one of a series of reports on housing and related subjects in developing countries. The series is issued by the Office of International Housing (OIH) of the Housing and Home Finance Agency (HHFA) as a service to the Agency for International Development (A.I.D.). The individual country reports are designed to assist in the orientation of A.I.D. technicians either in the United States or abroad. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (Author)

PB-179 370/2 PC A06/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Proposed Minimum Standards for Permanent Low-Cost Housing and for the Improvement of Existing Substandard Areas.
Harold Robinson. May 66, 107p*

Keywords: *Housing, Standards, Latin America, Buildings, Law, Performance(Engineering), Heating, Construction, Sanitary engineering, Electrical equipment, Fire safety, Public health, Management planning, Design, Underdeveloped countries, Area planning and development, Plumbing.

At the request of the Latin America Bureau, Agency for International Development, these proposed minimum standards were developed by the Division of International Affairs, Department of Housing and Urban Development, for use in Latin America. They are based principally on codes, ordinances and standards obtained from countries in Central and South America and the Caribbean Area, and on discussions with officials and technicians of selected countries in these regions. In so far as possible, they are performance standards, rather than specification standards and thus are generally applicable to the entire region. These standards are not to be construed as 'desirable standards', but rather are intended to meet only the minimum basic needs of families of low income. Their purpose is, however, to provide these families with a dwelling which is structurally safe, reasonably durable and which will not require excessive maintenance or repair during the life of the mortgage. They are also intended to provide a decent environment and to serve as a guide to improving, at least on a temporary basis, substandard areas which lack even the minimum of amenities, or a semblance of order.

PB-179 376/9 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Squatter Settlements. The Problem and the Opportunity.
Ideas and Methods Exchange no. 63, 302 Urban Planning
Charles Abrams. Apr 66, 49p

Keywords: Urban areas, *Housing, Social sciences, Law, Economics, Population, Public opinion, Sewage, Urban planning, Advanced planning, Costs, Safety, Site selection, Employment, Public health, Structures, State-of-the-art reviews, Area planning and development, Squatters.

The report discusses the world-wide problem of 'squatters' in urban slums. The legal and economic problems associated with squatter villagers are examined.

PB-179 383/5 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC.
Sewage Lagoons for Developing Countries.
Ideas and Methods Exchange No. 62, 302/12/1 Sewage Lagoons.
Thomas Callaway, and Bernard Wagner. Jan 66, 41p
Prepared in cooperation with Department of State, Washington, DC. Agency for International Development.

Keywords: Urban planning, Wastes(Sanitary engineering), *Sewage disposal, Sewage, Wastes(Industrial), Rural areas, Housing, Humans, Drainage, Irrigation systems, Water, Site selection, Soil mechanics, Evapotranspiration, Advanced planning, Public health, BOD(Biochemical oxygen demand), Area planning and development, Sewage lagoons.

Many cities in developing countries lack acceptable community sewage disposal systems. The failure to provide safe, effective means of disposing of human and other wastes present problems, the seriousness of which cannot be overestimated. The cost of constructing adequate treatment plants often discourages their installation in cities with limited budgets. However, treatment is possible by means of sewage lagoons which are usually less expensive than more conventional methods. (Author)

PB-179 385/0 PC A06/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Manual on Design for Low-Cost and Aided Self-Help Housing.
Ideas and Methods Exchange No. 37
Wolcott C. Waggaman, and Robert Dodge. Jun 67, 111p

Keywords: Housing, *Houses, Construction, Handbooks, Management planning, Design, Costs, Central America, West Indies, Puerto Rico, Cambodia, Iran, Surinam, Industrial training, Chile, China, Greece, Specifications, Construction materials, Organizations, Area planning and development, Self-help housing, Low-cost housing, Community action programs.

Since World War II, the desires--and real needs--for better homes have intensified. For economic, social, and political reasons great interest has developed in improving shelter for the ill-housed majority of the people of the world. In many countries, families, except those in the higher income group, build the houses they occupy. Self-help is the accepted way to build a house using local, readily available materials and the labor of each family. The basic principles of good design for aided self-help are really no different than those of good design anywhere. Effective arrangement; simple construction techniques; and efficient use of labor and materials, all considered in proper relation to local conditions, customs, desires, and taboos, can go far toward providing durable, livable houses within available money resources. (Author)

PB-179 408/0 PC A03/MF A01
National Council on the Aging, Inc., New York.
Operation III: Loaves and Fishes. A Model Community Action Program to Provide Nutritious Low-Cost Meals to the Elderly.
Final rept.
Geneva Mathiasen, and Jack Ossofsky. 23 Jul 56, 34p
Contract OEO-79

Keywords: Food, Adults, Costs, *Food services, Sociology, Aging(Physiology), Employment, Training, Education, Nutrition, Costs, Loaves and fishes operation.

The major purpose of this project is to provide nutritious meals and foodstuffs at low cost to older persons living on marginal or poverty level incomes. Meals will be prepared so that they may be eaten where purchased, or packaged so they may be carried home or delivered to the homebound when necessary. In addition to providing meals, the project will seek to stretch the limited incomes of the elderly through implementation of surplus food programs, food stamp plans, and the development of marketing, home economics and related consumer education. Social action in connection with matters of consumer concern and protection will be encouraged. The project will provide employment opportunities for residents of the community being served, including the elderly, as well as opportunities for volunteer services by those who can afford to give of their time. Intensive community relations and case finding will be undertaken to insure maximum utilization of the program by the elderly. (Author).

PB-179 475/9 PC A08/MF A01
Memphis and Shelby County Planning Commission, Memphis, Tenn.
Community Facilities Study. Volume III. Sanitary Sewers.
Comprehensive planning rept.
Feb 68, 164p*
See also Volume 2, PB-179 474. Prepared in cooperation with Allen and Hoshall-Clark, Dietz and Assoc., Memphis, Tenn. PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE.

Keywords: Urban planning, Tennessee, Sanitary engineering, *Sewage disposal, Tennessee, Sewage, Predictions, Construction, Costs, Population, Rivers, Maps, Urban areas, Rural areas, Water pollution, Wastes(Industrial), Area planning and development, Land use, Memphis(Tennessee), Evaluation, Interceptor sewers, Shelby County(Tennessee).

Described in this report are the lengths, sizes and approximate locations of sanitary sewers needed to provide service to Shelby County through the year 1990. The results of an extensive investigation of the existing interceptor sewers in the County is also included. The

construction of the needed sewers is divided into five-year increments beginning in 1970. Sewer capacity was determined by studying population forecasts and land use predictions for the County. Estimated construction costs for each phase are presented with unit costs being forecast for the future based on previous construction data. A detailed study of the sewage treatment needs for the County is currently being prepared for the City of Memphis, however, preliminary costs of these facilities are included in the report. (Author)

PB-180 245/3 PC A03/MF A01
Cooperative League of the USA, Chicago, Ill.
Potential Cooperative Projects.
Final feasibility rept.
Stanley Dreyer. 28 Dec 65, 28p
Contract OEO-598

Keywords: Organizations, *Cooperatives, Feasibility studies, Standards, Management planning, Urban areas, Rural areas, Budgets, Training, Cooperative projects, Community action programs, Chicago(Illinois).

No abstract available.

PB-180 476/4 PC A03/MF A01
Clapp and Mayne, Inc., San Juan, Puerto Rico.
Feasibility Study for Establishing a Bicycle Manufacturing Plant in Puerto Rico.
Final rept.
Dec 68, 44p
Contract DC-8-35352

Keywords: *Industrial plants, Vehicles, *Puerto Rico, Feasibility studies, Economics, Commerce, Assembling, Production, Costs, *Bicycles.

A study was made to establish the economic feasibility of manufacturing bicycles to satisfy the small but growing internal Puerto Rican market. However, during the course of the investigation, the Consultants became aware of a series of developments in the United States bicycle market that, upon further investigation, led them to broaden the original scope of the study to include an evaluation of the feasibility of producing bicycles in Puerto Rico for sale in this market and for shipment to the United States. Nonetheless, the original concept of a local market-oriented factory has been kept intact, so the study provides an evaluation of that possibility independently of an export market. (Author)

PB-180 509/2 PC A06/MF A01
Johns Hopkins Univ., Baltimore, MD. Dept. of Sanitary Engineering and Water Resources.
An Evaluation of the Problems of Sanitary Sewer System Design.
Final rept.
John C. Geyer, and John J. Lentz. Sep 64. 114p*
FHA-564
Technical studies publication.

Keywords: Sanitary engineering, Sewage, *Sewage disposal, Wastes(Sanitary engineering), Pipes, Water supplies, Housing, Maintenance, Costs, Urban areas, Rural areas, California, Maryland, Florida, Missouri, Evaluation, Sewer systems.

General problems facing sewer designers have been studied using field data collected in four U. S. communities. Analysis of these data indicates that basic causes of maintenance difficulties are tree roots, accumulations of debris in the absence of roots, other causes, and in areas having cohesionless sub-soil, sewer cave-ins. Proportionately fewer blockages occur when grades are moderate, and proportionately more occur at the upper terminals of the sewers. In eight-inch pipe, manhole spacing has little effect on the labor costs of stoppage relief. Emphasis is placed on statistical techniques for estimating domestic sewage flow. Flow of rainwater and groundwater was at times found to be excessive in all systems studied. Limited data on costs of operating and maintaining sewage pumping stations are reported and evaluated. (Author)

PB-182 735/1 PC A02/MF A01
Department of Forestry and Rural Development, Vancouver (British Columbia). Forest Products Lab.
Wood Species and Glues Influence Plywood Bond Durability.
Information rept.
P. L. Northcott. Aug 68, 24p* Rept no. VP-X-42

Keywords: Plywood, Bonding, Wear resistance, *Adhesives, *Wood, Specifications, Thickness, Roughness, Classification, Exposure, Regression analysis, Degradation, Loading(Mechanics), Effectiveness, Graphs(Charts).

The research demonstrates that durability of 3/8 in., 3-ply plywood manufactured with a single glue is strongly dependent on the species of wood. Furthermore, the influence of species on durability tends to be different for each type of glue. Twelve 4'-square panels of plywood were manufactured from each of the combinations of six species of wood and ten glues. Plywood shear specimens were subjected to each of six bond-degrading systems for times up to 160 days. (Author)

PB-182 764/1 PC A02/MF A01
Department of Forestry and Rural Development, Vancouver (British Columbia). Forest Products Lab.
Balsam Woolly Aphid-Infested Abies Wood as a Source of Pulp Fibre.
Information rept.
K. Hunt. May 68, 25p* Rept no. VP-X-39

Keywords: Hemiptera, *Wood, Wood pulp,*Pulp, Sources, Trees, Pest control, Chemicals, Life cycle, Damage, Eggs, Wind, Airborne, Climatology, Physical properties, Cell wall, Economics, Canada, Adelges piceae, Fir trees.

The life cycle of the balsam woolly aphid (Adelges piceae Ratzeburg) and its effect on trees and wood of various Abies species is briefly described. Several methods, natural and chemical, for controlling the pests are cited. The effect of advanced infestation on the quality of pulp produced from Abies wood by the different industrial processes is shown to include a reduction in yield of 10% and a decrease in strength of 20 to 30%. Recommendations regarding further pulping research are made in the light of various economic considerations. It is recommended that a detailed polysaccharide analysis be carried out on the aphid-infested wood of Abies balsamea. (Author)

PB-183 125/4 PC A06/MF A01
Bureau of Labor Statistics, Washington, DC.
The Forecasting of Manpower Requirements.
Apr 63, 101p Rept no. BLS-248

Keywords: Manpower, Predictions, Labor, Economics, *Employment, Statistical analysis, Manpower requirements, Manpower resources, Manpower estimates.

The manual was prepared in the Bureau of Labor Statistics' Division of Foreign Labor Conditions and is intended to serve as a guide in forecasting the manpower requirements associated with economic development. The method outlined is based largely on United States experience. However, the author has suggested modifications of the techniques used in the United States, based upon a study of forecasting techniques employed in different countries. (Author)

PB-183 126/2 PC A09/MF A01
Bureau of Labor Statistics, Washington, DC.
Conducting a Labor Force Survey in Developing Countries.
Sep 64, 183p Rept no. BLS-263

Keywords: Labor, Manpower studies, Statistical data, Collecting methods, Personnel management, Questionnaires, *Employment, Classification, Data processing systems, Management planning, Sampling, Recruiting, Training, Developing countries, Interviews.

This manual is intended as a training guide for the professional staff which is conducting a labor force survey in developing countries. Such a survey is the best and cheapest method of obtaining dependable information on total employment, unemployment and underemployment. The manual describes procedures in nontechnical language. It covers all phases of the survey from purpose to final publication and provides a substantial amount of reference material. (Author)

PB-184 123/8 PC A09/MF A01
Kaiser Engineers, Oakland, CA.
In-Cities Experimental Housing Research and Development Project, Phase I. Composite Report. Volume III. technology.
Mar 69, 181p* Rept no. KE-69-8-R-4
Contract HUD-H-1011
Compiled from Phase I reports prepared by Building Systems Development, Inc., Contract HUD-H-971; Westinghouse Electric Corp., Contract HUD-H-970; and Abt Associates, Inc., Contract HUD-H-969. See also Volume 2, PB-184 122 and Volume 4, PB-184 124.

Keywords: *Housing, *Urban planning, Housing projects, Construction, Urban areas, Design, Configuration, Materials, Structural parts, Manufacturing methods, Assembling, Cooling, Heating, Electrical equipment, Industries, Indexes, Modular construction, Low cost housing.

The objective of this report is to present for public information the useful data on technological innovation in low-cost housing collected by the three Phase I Contractors. During Phase I, a large file of data on innovative systems and components was accumulated. Some of these systems and components had been tested and others were in the design stage only. Some had been used in foreign countries but not in the United States. This file of data has been assembled in this volume for use as a general guide to those concerned with the planning and construction of low-cost housing. (Author)

PB-184 450/5 PC A07/MF A01
Mater Engineering Corvallis, Oreg.
A Feasibility Study for a Small LOG Sawmill on the Fort Apache Indian Reservation in Central Arizona.
Apr 69, 137p*
Contract C-8-3529

Keywords: *Wood, Cutting, *Industrial plants, Arizona, Rural areas, Feasibility studies, Industrial production, Forestry, Sources, Costs, Configuration, Operation, Predictions, Economics, Sociometrics, Indian reservations, *Sawmills, Fort Apache(Arizona).

The study investigated the feasibility of constructing an additional sawmill facility on the Fort Apache Indian Reservation to saw small logs which the existing mill cannot handle profitable. The study included a survey of the wood supplies and the selection of the optimum log conversion configuration to profitable convert the available small logs into saleable lumber and chips. Eight configurations were studied for converting the small logs to lumber. An in-depth analysis resulted in projected operating statements which indicate that this small log mill should be economically advantageous to the Tribe. (Author)

PB-184 458/6 PC A17/MF A01
National Bureau of Standards, Washington, DC. Inst. for Applied Technology.
The Performance Concept: A Study of Its Application to Housing. Volume One.
John P. Eberhard. 2 Jun 69, 380p*
Revision of Rept. no. NBS-9849 dated 3 Jun 68. Sponsored in part by Department of Housing and Urban Development, Washington, D. C. See also Volume 3, PB-184 459.

Keywords: *Housing, Standards, Management engineering, Design, Specifications, Structural properties, Materials, Safety, Life expectancy, Costs, Environment, Measurement, Sanitary engineering, Food, Electrical equipment, Machines, Low cost housing, Building codes, In house service systems.

The report, in three volumes, is the result of a study which investigated the hypothesis that, if adequate performance standards for low-cost housing are developed; and if they are broadly used, an important and fundamental way will be opened to accommodate the introduction of cost-reducing innovations into the design of low-cost housing. Volume 1 contains the main body of discussion and recommendations.

PB-184 459/6 PC A17/MF A01
National Bureau of Standards, Washington, DC. Inst. for Applied Technology.
The Performance Concept: A Study of Its Application to Housing. Volume Three.
John P. Eberhard. 2 Jun 69, 381p*
Revision of Rept. no. NBS-9851 dated 3 Jun 68. Sponsored in part by Department of Housing and Urban Development, Washington, D. C. See also Volume 1, PB-184 458.

Keywords: *Housing, Standards, Documentation, Site selection, Design, Budgets, Construction, Management planning, Costs, Transformations, Mechanical drawing, Sociometrics, Urban planning, Statistical data, Materials, Low cost housing, Poverty, Ethnic groups.

The report is the third volume of a three volume presentation on the design of low cost housing. It contains the supplimentary documents prepared by individuals and organizations.

PB-184 876/1 PC A09/MF A01
National Bureau of Standards, Washington, DC. Inst. for Applied Technology.
The Performance Concept: A Study of Its Application to Housing. Volume Two.
John P. Eberhard. 3 Jun 69, 194p*
Revision of Rept. no. NBS-9850 dated 3 Jun 66. See also Volume 1, PB-184 458, and Volume 3, PB-184 459. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.

Keywords: *Housing, Standards, Design, Specifications, Costs, Structural properties, Rural areas, Management planning, Decision making, Economics, Money, Law, Public health, Life expectancy, Sociology, Alaska, Low cost housing, Poverty, Ethnic groups, Indian reservations, Problem solving, Building codes.

This report, in three volumes, is the result of a study conducted by the Institute for Applied Technology of the National Bureau of Standards for the Department of Housing and Urban Development. This study investigated the following hypothesis: 'It is hypothesized that, if adequate performance standards for low-cost housing could be developed, and if they were broadly used, an important and fundamental way would have been opened to accommodate the introduction of cost-reducing innovations into the design of low-cost housing.' The report finds this hypothesis to be generally correct, but emphasizes the need for the development of the necessary knowledge to implement the performance concept. This volume contains appendices titled as follows: Needs of the rural poor in low cost housing; Housing of Indians on reservations and of Alaskan natives; Conceptual structure of low cost/low income housing; Nature of the problem; Implementation of the performance concept in regulatory and acceptance systems such as the minimum property standards.

PB-185 891/9 PC A03/MF A01
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Study of Factors Affecting Feasibility of Low Head Hydroelectric Generation.
Final rept.
Albert G. Mercer. Mar 69, 29p* Rept no. CER68-69AGM26
Contract DI-14-06-D-6586

Keywords: Power plants, Feasibility studies, *Turbines, Hydraulic systems, Hydrostatics, Hydrodynamics, River currents, Electric power production, Site selection, Costs, Electrical equipment, Diffusers, Efficiency, *Dams, State-of-the-art reviews, Europe, North America, *Hydroelectric power, Low head hydroelectric power production, Hydraulic turbines, Turbogenerators, Head(Fluid mechanics).

The feasibility of generating electricity from hydropower developments having low heads depends on the characteristics and the cost of the available equipment as well as the cost of producing electricity from alternative sources. The recent development of the tubular turbine has resulted in many advantages for the economical development of low head hydropower. Many units with heads as low as 10 feet have been built in Europe. Twenty five feet appears to be the practical lower limit in North America. The flowing water of rivers provides a possible source of energy for generating electricity. This energy could be developed using turbines similar to some modern airfoil wind turbines but the economics are such that this source will probably never be exploited. Head, itself, is the most important factor affecting the feasibility of low head hydropower. Given two well designed low head plants of equal discharge capacity, the lower head plant will be less feasible because the kw output will be lower but the costs will be higher. The lower head plant will have larger, slower turning turbines and larger inlet and outlet passages. (Author)

PB-186 188/9 PC A08/MF A01
National Swedish Inst. for Building Research, Stockholm (Sweden).
Social Aspects of Housing and Urban Development.
1969, 166p* Rept no. Byggforskningen-3:1969
Paper copy also available from The National Swedish Institute for Building Research, Box 27 163, S-102 52, Stockholm 27, Sweden. Sw. Kr. 20.

Keywords: Urban planning, *Housing, Bibliographies, Economics, Sociology, Africa, Asia, Australia, Central America, South America, Europe, North America, Abstracts, Low cost housing, Developing countries.

The bibliography is part of a continuing project of the Housing Section of the United Nations Centre for Housing, Building and Planning. The aim of the bibliography was to provide a broad view of the published literature dealing with the experience of countries which have made substantial progress in solving the social problems of housing and urban development, paying particular attention to such aspects as: an appropriate programme of economic development in urban and rural areas leading to an accelerated raising of the standard of living, the provision of appropriate dwellings for all, the initiation and construction of housing for low-income families, the keeping of rents within a reasonable share of family incomes, the improvement of existing housing and the clearance of slums. (Author)

PB-186 514/6 PC A04/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Milled Rice.
R. Poliakoff. Sep 61, 61p
Revision of Report prepared by Wolf Management Engineering Co., Chicago, Ill.

Keywords: Cereals, Processing, *Industrial plants, Specifications, Milling machines, Materials, Labor, Buildings, Power supplies, Water supplies, Costs, Personnel, Training, Safety, Economics, Law, Warehouses, Machines, Management engineering, *Rice, Rice polisher machines.

The purpose of the report is to provide basic information for establishing a plant in a foreign country to process rice. (Author)

PB-187 565/7 PC A09/MF A01
Steffire Associates, Inc., Laguna Beach, Calif.
The Small New Business.
Final rept.
Volney Steffire. Aug 69, 181p*
Contract OEO-4786

Keywords: Commerce, *Management planning, Starting, Organizations, Industries, Economics, Motivation, Money, Sociology, Production control, Predictions, Site selection, Growth, Computer programs, Costs, *Small businesses, Economic development, Marketing, Product development, Accounting, Profits, Cash flow, Computer analysis.

Contents: The general problem; Finance; Marketing; Production; Organization; Starting a new small business; Growth and/or decline; The nature of a small business development company.

PB-188 841/1 PC A02/MF A01
Illinois Univ., Urbana. Water Resources Center.
Impact of Community Water Systems in Small Towns.
Final rept. 1 Sep 67-30 Jun 68
Walter J. Wills, and Donald D. Osburn. Jun 69, 20p
WRC-RR-20, OWRR-A-027-ILL(1)
Contract DI-14-01-0001-1081

Keywords: *Water supply, Urban areas, *Management planning, Fire safety, Sanitary engineering, Installation, Rural areas, Illinois, Water consumption.

The primary purpose of this study was to describe the impact the addition of a community water system to a small town would have upon that town and the surrounding communities. The benefits of the system were recognized by the residents and some of the first round impacts were measured. Benefits observed were increases in the number of water using appliances, increases in property values, improved fire protection and sanitary conditions. (Author)

PB-188 851/0 PC A07/MF A01
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.
A Proposed Urban Development Program for Tegucigalpa, Honduras.
James A. Moore. 25 Aug 67, 134p Rept no. PASA-LA(KA)-53-67

Keywords: *Urban planning, *Honduras, *Housing, Urban planning, Costs, Management planning, Training, Government(Foreign), Economics, Tegucigalpa(Honduras), Developing nations.

The report describes an urban development program prepared for Tegucigalpa, including urban planning, public finance, public administration, and training. The program seeks to institutionalize the planning function in Tegucigalpa to enable the government to prepare, finance, and administer such plans, and to encourage local citizen participation. (Author)

PB-188 852/8 PC A03/MF A01
FCH International, Inc., Washington, D.C.
Housing the Campesino. A Case Study of Cooperative Housing in Rural Panama.
1966, 28p

Keywords: Rural areas, *Housing, Housing projects, *Panama, Wages, Economics, Costs, Research program administration, Management planning, Los Pocitos(Panama), Developing nations, Low income families.

The report describes a case study of cooperative housing in Los Pocitos, Panama. It describes the organization and administration of the housing program, the design and financing of typical houses in the project, and its applicability in other locations. (Author)

PB-188 918/7 PC A05/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Earth for Homes: Ideas and Methods Exchange No. 22.
May 69, 79p*
Revision of report dated Sep 56.

Keywords: Housing, Construction materials, *Soils, Buildings, Construction, Soil mechanics, Walls, Floors, Roofs, Compacting, Cements, Weatherproofing, Structural properties, Finishes and finishing, Test methods, Brick, Mud, Earthquake-resistant structures, State-of-the-art reviews, *Houses, *Building materials, *Adobe, Earth construction, Soil compacting, Soil aggregates, Admixtures, Pozzolans, Soil properties, Soil cement, Cob construction, Adobe brick, Wattle and daub.

Contents: Early uses of earth; Soils; Methods of earth wall construction; Stabilization of earth by admixtures; Earth floors; Earth roofs; Wall finishes; The design of earth walls.

PB-188 921/1 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Bamboo as a Building Material.
F. A. McClure. Jun 67, 58p
Revision of reports dated May 53 and Jun 67.

Keywords: Housing, Construction materials, Plants(Botany), Buildings, Foundations(Structures), Supports, Floors, Walls, Doors, Roofs, Pipes, Reinforcing materials, Reinforced concrete, Abundance, Structural properties, Preservation, Construction, Small tools, *Building materials, *Bamboo reinforced concrete, Bamboo, Frames, Ceilings(Architecture), Windows, Troughs, Biogeography.

Contents: Parts of a house for which bamboos are suitable; Bamboo reinforcement of concrete; Geographical distribution of bamboos; Differences among species; Some bamboos used in housing; Shortcomings of bamboo and how to overcome them; Preservation; Skill requirements; Tool requirements; Differentiation and evaluation of species; Collecting specimens for identification.

PB-188 925/2 PC A05/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Physiological Objectives in Hot Weather Housing.
Douglas H. K. Lee. Jun 69, 83p*
Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md. Revision of report dated May 63.

Keywords: Housing, Tropical regions, Heat tolerance, Physiology, Climatology, Humidity, Temperature, Buildings, Configuration, Reflection, Cooling, Solar radiation, Heat transfer, *Houses.

The report presents an introduction to hot weather housing design. Hot dry and hot humid environments are included. (Author)

PB-188 926/0 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Village Housing in the Tropics, with Special Reference to West Africa.
Keith H. Hinchcliff. Jun 69, 72p
Prepared in cooperation with Illinois Univ., Urbana. Revision of report dated May 63.

Keywords: *Housing, Tropical regions, Urban planning, *Subsaharan Africa, Site selection, Climatology, Terrain, Problem solving, Water supplies, Public health, Buildings, Construction materials, Culture, Nigeria, Ghana, Villages, Community facilities, Sierra Leone, Gambia.

The document discusses the optimum location of villages, types of village layouts, housing design, and community facilities, with special reference to West Africa.

PB-188 931/0 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Aided Self-Help in Housing Improvement.
Ideas and methods exchange.
Aug 69, 64p* Rept no. IME-18
Revision of report dated Jan 67.

Keywords: *Housing, Construction, Sociometrics, Rural areas, Management planning, Costs, Labor, Standards, Construction materials, Terrain, Burma, Jamaica, Puerto Rico, Greece, Taiwan, Sweden, Self help housing, Community development, Technical assistance.

The document discusses fundamental principles and role of aided self-help housing and how to organize self-help projects and secure technical and financial assistance. It describes programs in Burma, Jamaica, Puerto Rico, Greece, Taiwan and Sweden.

PB-189 171/2 PC A05/MF A01
Hawaii Univ., Honolulu. Water Resources Research Center.
Identification of Return Irrigation Water in the Subsurface: Water Quality.
Project completion rept. 1 Jul 68-30 Jun 69
Pedro A. Tenorio, Reginald H. F. Young, and H. Collins Whitehead. Oct 69, 92p TR-33, OWRR-B-012-HI(1)
Contract DI-14-01-001-1495
Report on Identification of Irrigation Return Water in the Subsurface - Phase II.

Keywords: Water supplies, Hawaii, Irrigation systems, Quality control, Agriculture, *Irrigation, *Water quality, Water wells, Sampling, Nitrates, Phosphates, Bromides, Carbonates, Fluorides, Calcium compounds, Magnesium compounds, Silicates, Sulfates, Rainfall, Chemical analysis, Solids, Tropical regions, *Irrigation, Pearl Harbor(Hawaii), Irrigation return water, Oahu Island.

A joint research effort was undertaken by the Water Resources Research Center and the Honolulu Board of Water Supply to investigate the physical and chemical characteristics of irrigation return water in Pearl Harbor-Waipahu, Oahu, an area used for tropical agriculture. The project was started in 1967 and was expanded in 1968 to include Kahuku, Oahu and Central and West Maui. Well samples and profile samples were obtained with a thief sampler in the Pearl Harbor-Waipahu area and composite samples were obtained mainly from pumping wells in other areas. In addition, both spring and stream waters in the Pearl Harbor-Waipahu area were analyzed for a number of inorganic constituents. Stream waters in the main study area were observed to contain appreciable quantities of nitrate, phosphate, bromide, bicarbonate, and fluoride. Similar trends were observed with the spring samples including increases of calcium, magnesium, silica, sulfate, and nitrate. Well waters from the main study area were evaluated according to Visher and Mink's index constituents, silica, sulfate, and nitrate, and other significant ionic compositions. General analysis of major constituents evidenced a cyclical trend in concentration, either related to seasonal rainfall and irrigation practices, or both. (WRSIC abstract)

PB-189 255/3 PC A06/MF A01
Bureau of Water Hygiene, Rockville, Md.
Guidelines and Criteria for Community Water Supplies in the Developing Countries.
1969, 108p

Keywords: *Water supply, Management planning, Government(Foreign), Instruction manuals, Public health, Industries, Agriculture, Costs, Construction, Standards, Training, Maintenance, Quality control, Asia, Latin America, Water resources, Developing countries.

The report is a synthesis of ideas on guidelines and criteria developed from team surveys of community water supply programs in twelve developing countries, four of them in Asia and eigth in Latin America. The purpose was to examine AID operations in this field and identify those factors contributing to the development of successful projects as well as those hindering such development. Chapters are devoted to policies, laws and institutions, program planning, capital financing, manpower and training, technical standards, project development, contracts and construction, operation and maintenance, water utility management and developing public support. (Author)

PB-189 258/7 PC A05/MF A01
Federal Housing Administration, Washington, DC.
Minimum Design Standards for Community Water Supply Systems.
Jul 65, 76p Rept no. FHA-751

Keywords: Housing, *Water supply, Standards, Storage, Distribution, Chemical analysis, Purification, Iron, Manganese, Corrosion inhibition, *Water quality, Water resources, Water treatment, Water softening.

The purpose of the study was to set forth minimum design standards acceptable to FHA for water supply production, treatment, pumping, storage, and distribution facilities to serve properties offered as security for mortgage insurance. These minimum design standards apply to central water systems serving residential neighborhood developments and multifamily projects. (Author)

PB-189 625/7 PC A03/MF A01
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.
Housing in Ghana.
Country report series.
1964, 28p

Keywords: *Housing, *Ghana, Urban planning, Construction, Wages, Population, Economics, Labor, Statistical data, Rural areas, Foreign aid, Developing countries.

The report on housing in Ghana is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

PB-189 626/5 PC A02/MF A01
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.
Housing in India.
Country report series.
1964, 25p

Keywords: *Housing, *India, Urban planning, Law, Population, Economics, Construction, Labor, Rural areas, Government(Foreign), Statistical data, Research program administration, Foreign aid, Developing countries, Slum clearance.

The report on housing in India is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants schedules to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

PB-189 627/3 PC A02/MF A01
Department of Housing and Urban Development, Washington, D.C. Div. of International Affairs.
Housing in Jordan.
Country report series.
1965, 21p

Keywords: *Housing, *Jordan, Urban planning, Statistical data, Population, Wages, Construction, Sanitary engineering, Labor, Industrial plants, Developing countries, Construction loans.

The report on housing in Jordan is one of a series of reports on housing and related subjects in developing countries. They are also intended to provide basic information to consultants scheduled to undertake overseas assignments as well as to American businessmen interested in foreign investment. (AID abstract)

PB-189 628/1 PC A05/MF A01
Agency for International Development, Washington, DC.
Housing and Urban Development Programs: Latin American Bureau.
Harold Robinson. 1 Oct 67, 91p

Keywords: *Housing, *Latin America, Urban planning, Rural areas, Economics, Banking, Foreign aid, Construction, Statistical data, Law, Organizations, Wages, Low income housing, Investments, Construction loans, Urbanization.

A summary at the beginning of the report includes sections titled: Background, accomplishments and tasks ahead. Other sections provide information on U.S. Congressional action, A.I.D. policy and suggested policy, and descriptions of regional and country programs including objectives, funding and progress. (AID abstract)

PB-189 816/2 PC A03/MF A01
Wisconsin Univ., Madison. Land Tenure Center.
An Experimental Cooperative Farming Plan in Chile.
William C. Thiesenhusen. Oct 65, 43p Rept no. LTC-8

Keywords: Agriculture, *Chile, Management planning, Production, Organizations, Wages, Law, *Agricultural cooperatives, Cooperative farming, Land reform.

The report describes the organization and first-year operations of a small cooperative farm created by the Catholic Church The 16 farm families are under administrative guidance of a hired administrator. Credit and technical assistance are furnished by INPROA, the church's agency to administer land reform on church properties. Data on farm income and expenses indicate that families earned more during the first year of the cooperative than in previous years. They did not earn enough to make payments on land purchased. If management of the cooperative can be improved, the cooperative probably can become free of debt. However, trained or experienced managers are scarce. (Author)

PB-189 819/6 PC A03/MF A01
Wisconsin Univ., Madison. Land Tenure Center.
The Influence of Land Tenure Institutions on the Economic Development of Agriculture in Less Developed Countries.
Peter Dorner. Oct 68, 35p Rept no. LTC-55

Keywords: Agriculture, *Latin America, Economics, Wages, Population, Control systems, Management planning, Money, Public relations, *Agricultural economics, Land tenure, Developing countries, Rural to urban migration, Investments.

The document discusses the influence of land tenure systems upon income distribution and demand consequences, economic and political power distribution, investments in agriculture and supply consequences, investments in other sectors of the economy, and pre-

mature farm to city migrations. The existing relationships resulting from semi-feudal tenure systems are discussed. (AID abstract)

PB-189 831/1 PC A02/MF A01
Wisconsin Univ., Madison. Land Tenure Center.
Fitting Agricultural Extension to the Development Needs of Colombia.
Herman Felstehausen. Nov 68, 21p Rept no. LTC-57

Keywords: Agriculture, *Colombia, Government(Foreign), Management planning, Organizations, Production control, Models(Simulations), Reviews, Inequalities, Economics, *Agricultural extension services, Developing countries.

The document analyzes the agricultural extension services in Colombia. The three largest organizations in this field employ 1400 full-time workers. These workers do not reach small farmers with less than 5 hectares.

PB-189 919T PC A02/MF A01
Wisconsin Univ., Madison. Land Tenure Center.
Integrating the Rural Market Into the National Economy of Mexico.
Delbert T. Myren. Jun 68, 13p Rept no. LTC-46
Trans. of Comercio Exterior (Mexico) v17 n9 p706ff Sep 67. Presented at the Primer Congreso Nacional de Mercadotecnia, 21-23 Jul 1966, Cuernavaca, Morelos, Mexico.

Keywords: Economics, *Mexico, Rural areas, Commerce, Population, Sociometrics, *Agriculture, Fertilizers, Money, Management planning, Reviews, Translations.

The document has classified Mexico's agriculture into three sectors: A modern, commercial farming sector which consists of 20 percent of the farm families, a growing transitional sector which includes a rough 45 percent of the farm families, and the traditional or subsistence sector - 35 percent of the farm families. No mass market for consumer goods will come into being, the author says, until 80 percent of the farmers sharply increase their purchasing power.

PB-189 989/7 PC A03/MF A01
Wisconsin Univ., Madison. Land Tenure Center.
Rural to Urban Migration: A Colombian Case.
Research paper
William L. Flinn. Jul 66, 45p Rept no. RP-19

Keywords: *Agriculture, Economics, *Colombia, Population, Urban areas, Rural areas, Labor, *Employment, Sociology, Housing, *Migration.

The report presents the reasons for movement of farmers to urban areas. It discusses how rural to urban migration creates socio-economic development problems in both rural and urban sectors. The slum dwellers in shanty towns around cities believe that their housing, sanitation facilities, income, medical services, and education for children were better in the urban slums than in villages. Very few expressed a desire to return to rural areas. (AID abstract)

PB-190 672/6 PC A08/MF A01
Minnesota Univ., Minneapolis. Div. of Environmental Health.
Small Wells Manual: A Manual of Location, Design, Construction, Use and Maintenance.
Ulric P. Gibson, and Rexford D. Singer. Sep 69, 163p*

Keywords: *Water wells, Construction, Design, Maintenance, Permeability, Rehabilitation, Sanitary engineering, Protection, Site selection, Exploration, Purification, Well logging, Drilling machines, Cutting fluids, Centrifugal pumps, Rotary pumps, Jet pumps, Tables, Diagrams, Ground water, Water well construction.

The manual covers: (1) origin, occurrence and movement of ground water, (2) ground water exploration, (3) water well design, (4) well construction, disinfection, maintenance and rehabilitation, (5) pumping equipment, and (6) sanitary protection of ground water supplies.

PB-190 674/2 PC A05/MF A01
Public Health Service, Washington, D.C. Office of International Health.
Community Water Supply in Developing Countries. A Quarter-Century of United States Assistance.
Frederick E. McJunkin. 1969, 95p

Keywords: Foreign aid, Water supplies, Water supplies, Government(Foreign), Southeast Asia, Vietnam, Africa, Latin America, *Water supply, Developing nations, South Vietnam.

The report discusses the role of water supply in developing countries; the highlights of AID efforts to improve community water supplies on a worldwide basis with brief reports on typical activities country-by-country, but grouped on a regional basis, i.e. Near East and South Asia, East Asia and Viet-Nam, Africa, and Latin America. (Author)

PB-190 675/9 PC A99/MF A01
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.
Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume I. Periodical Literature.
Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 693p*
See also Volume 2, PB-190 676.

Keywords: Sociometrics, Transformations, Foreign aid, Bibliographies, Abstracts, Rural areas, Economics, Agriculture, *Education, Political science, Management planning, Attitudes, Africa, Asia, South America, Central America, West Indies, Pacific Ocean Islands, Europe, North America, *Social change, Planned social change, Annotated bibliographies, Foreign rural development, Developing countries.

The bibliography was prepared primarily to support the major research endeavors of the CIC-AID rural development research project. It is presented in preliminary form primarily for project use. Since a theoretical treatment of economic development in historical context and a specific analysis of a contemporary developing country are both relevant, the bibliography covers a wide range of materials. (Author)

PB-190 676/7 PC A10/MF A01
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.
Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume II. Books and Book Length Monographs.
Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 214p*
See also Volume 1, PB-190 675 and Volume 3, PB-190 677.

Keywords: Sociometrics, Transformations, Foreign aid, Bibliographies, Political science, *Education, *Social change, Agriculture, Economics, Africa, Asia, Europe, Latin America, Middle East, New Guinea, New Zealand, Management planning, Annotated bibliographies, Planned social change, Books, Foreign rural development, Developing countries.

The document, the second volume in a 3 part report on planned social change in developing countries, contains an annotated bibliography on foreign rural development.

PB-190 677/5 PC A09/MF A01
Minnesota Univ., Minneapolis. Center for Comparative Political Analysis.
Bibliography on Planned Social Change (With Special Reference to Rural Development and Educational Development). Volume III. Government Reports, U.N. Reports and Proceedings of Special Conferences.
Richard Blue, Robert T. Holt, John E. Turner, Richard Erikson, and David Garnham. 1 Jan 67, 196p*
See also Volume 1, PB-190 675.

Keywords: Sociometrics, Transformations, Foreign aid, Bibliographies, Economics, Agriculture, *Education, Africa, Asia, Middle East, Latin America, Pacific Ocean Islands, Australia, New Zealand, Europe, North America, *Social change, Annotated bibliographies, Planned social change, Foreign rural development, Developing countries.

The document, the third volume of a three part bibliography on planned social change in developing countries, contains government reports, UN reports, and proceedings of conferences on foreign rural development.

PB-191 100/7 PC A05 MF A01
Library of Congress, Washington, D.C. Special Bibliographies Section.
Fish Protein Concentrate. A Comprehensive Bibliography.
Bruce R. Stillings. 9 Apr 70, 83p

Keywords: Seafood, Proteins, Bibliographies, Seafood, Nutrition, Food, Chemical analysis, Processing, Diet, Fishes, *Fish protein concentrates.

This bibliography has been prepared to provide a comprehensive source of information on efforts directed toward fish protein concentrates mainly for human use. Contents include: General aspects; Processing methods; Chemical composition; Nutritional studies; Acceptability and use in foods.

PB-192 728/8 PC A04/MF A01
Missouri Univ., Columbia. Dept. of Atmospheric Science.
Estimates of Potential Productivity from the Climatology of Solar Energy.
Final rept.
1 May 70, 67p
Grant Cwb-WBG-37

Keywords: Corn, Production, Solar radiation, *Agriculture, Photosynthesis, Sunspots, Attenuation, Scattering, Absorption, Heat flux, Atmosphere models, Water vapor, Cloud cover, Statistical data, *Crops, *Solar energy, Solar flux.

The report deals with climatological evaluation and concerns an experimental study of the energy use by a corn canopy. (Author)

PB-192 750/8 PC A04/MF A01
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
Simplification of Integrated Stormwater Planning for Modern Multiple Land Use in Urban and Suburban Developments.
Project technical completion rept.
Brian M. Reich. 31 Mar 70, 62p* OWRR-B-010-PA(1)
Contract DI-14-01-0001-1046

Keywords: *Hydrology, Management planning, Storms, Urban areas, Drainage, Rural areas, Terrain, Floods, Control, Mathematical models, Programming(Computers), Storage, Dams, Deterrence, Design, *Land use, Synthetic hydrographs, Flood routing, Surface water runoff, Watersheds.

Four synthetic hydrograph methods were applied on five watersheds in hopes of simplifying planning decisions for reserved space in valley bottoms of suburbia headwaters. Both hydrograph and routing procedures were programmed for digital computer evaluation for the more than 300 cases considered. General conclusions include the following. (1) No simple rules can be given on width of floodways to planners. Each case must be individually investigated. (2) Computer methods greatly facilitate routing and synthetic hydrograph computations. (3) Generalizations are impossible because interactions occur between the method used, the return period, and the percentage of the watershed above the reservoir among others. (4) A great need exists for data-based methods for predicting suburban design hydrographs in ungaged situations. (5) A new course on urban hydrology was developed from the studies results. The course is designed to teach hydrologists the modern techniques which are being developed to solve this set of urban problems. (WRSIC abstract)

PB-192 794/6 PC A03/MF A01
Road Research Lab., Crowthorne (England).
Representative Rural Catchments in Kenya and Uganda.
D. Fiddes, and J. A. Forsgate. 1970, 35p Rept no. RRL-LR318

Keywords: Drainage, Subsaharan Africa, Rainfall, Networks, Containers, Terrain, Soils, Swamps, Fluid flow,

Permeability, Hydraulic models, Floods, Storage, Rural areas, *Kenya, Great Britain, *Hydrology, Catchments, Surface water runoff, Culverts, *Uganda.

The report describes networks of small rural catchments throughout Kenya and Uganda. The purpose of these is to provide data for the development of a design method for the estimation of waterway sizes for small bridges and culverts. The six catchments in each country are described. They have been sited to provide information on the effect on the runoff hydrograph of the following catchment parameters: (a) area, (b) spatial and temporal rainfall variability, (c) topography and soil type, (d) swamp. For each catchment a rainfall runoff correlation will be prepared, and unit hydrographs isolated. (Author)

PB-193 553/5 MF A01
Economic Development Administration, Washington, D.C.
Formula for Growth: How to Make an Industrial Site Survey.
Oct 69, 30p
Paper copy available from Superintendent of Documents, GPO, Washington, D.C. 20402. as C48.8:IN2.

Keywords: Industries, *Site selection, Urban areas, Industries, Terrain, Factor analysis, Urban planning, Rural areas, Mapping, Aerial photographs, Roads, Water supplies, Sanitary engineering, Hydrology, Law, Handbooks, Industrial sites, Economic development, Area planning and development, Zoning, Tax rates.

A firm seeking a location for a new plant needs a site ideal for both present use and future expansion. To back its efforts to attract new industry, a local economic development organization must be fully prepared to supply information on individual plant sites in the area and to point out the unique advantages of each site. The guide explains how to identify sites ideal for industry and how to assemble this information for use in attracting new and expanding companies.

PB-194 368/7 PC A09/MF A01
Kansas Dept. of Economic Development.
A Design Study on the Economic Use of Agricultural Wastes in Kansas.
Kansas planning for development.
Jan 69, 183p* Rept no. 25
Prepared in cooperation with Theracon, Inc., Topeka, Kans. and Kansas Economic Development Commission.

Keywords: *Agricultural wastes, Utilization, Waste disposal, Effectiveness, Economic development, Kansas, Management planning, Benefit cost analysis, Research projects, Environmental engineering, Water pollution, Control, *Waste recycling.

The report represents a study of agricultural wastes in Kansas and the technology available for economic utilization. The principal wastes that may provide raw materials for profitable utilization are identified and data on location and quantity of each waste are presented. The most important agricultural waste in Kansas comes from large cattle feedlots. Since disposal is costly to the cattle feeding industry utilization technology is sought to provide raw material for economic development. (Author)

PB-194 391/9 PC A03 MF A01
Ernst and Ernst, Washington, DC.
Study of Raw Material Costs for a Proposed Straw-Based Pulping Mill in the Vicinity of Mobridge, South Dakota.
Aug 70, 36p EDACOMM-70-001
Contract C-9-35084

Keywords: Pulp mills, Cost estimates, Economic development, South Carolina, Corrugating, Straw, Waste papers, Employment, Pulping, Feasibility, *Pulp, *Paper, *Agricultural wastes, Straw based pulping, Technical assistance, Mobridge(South Dakota).

The concept of establishing a mill to manufacture corrugating medium on land owned by the Standing Rock Sioux Indian Tribe in the vicinity of Mobridge, South Dakota has been to take advantage of one of the area's abundant and relatively little-used resources, wheat straw, as a principal ingredient. The specific purpose of this study was to: (1) determine the availability of sufficient straw to support the proposed mill; (2) to determine various cost elements attendant to the collection and storage of straw and the availability and procurement costs of the other principal ingredient of the mill's output - waste paper. (Author)

PB-194 757/1 PC A06/MF A01
California State Dept. of Housing and Community Development, Sacramento.
Demonstration in Low-Cost Housing Techniques.
Final rept.
Charles R. LeMenager, Ed Bowe, and Dean C. Hill.
Jun 70, 110p*
Contract HUD-H-650

Keywords: Residential buildings, California, Rural areas, Construction management, Cost analysis, Construction materials, Drawings, Evaluation, Factor analysis, Statistical data, Time, *Building materials, *Houses, Low cost housing, Demonstration projects.

The low income housing demonstration project is part of the search for means of developing housing to be utilized for low income domestic and often migratory farm workers in the western states. The objective was to study methods of construction, building materials and supplies, and building plans in three California areas which would produce inexpensive housing. A total of 28 units were built using a variety of construction techniques. Studies of the units and their occupants have been made and the results are recorded. The report reflects building costs and building construction features, as well as the amenities or undesirable features of these structures as seen through the eyes of professional building evaluators, housing authority officials, and the residents themselves. (Author)

PB-195 052/6 PC A08/MF A01
Bureau of Commercial Fisheries, Ann Arbor, Mich.
Evaluation of an Experimental Fish Reduction Process Applicable to Small Fisheries.
Jul 70, 165p* EDACOMM-70-012

Keywords: Economic development, Fisheries, Fresh water fishes, Processing, Aquatic animals, Pesticides, Removal, Cost analysis, Feeding stuffs, Animal nutrition, Production capacity, Market research, *Fishes, Mink industry, Fishcare, Pressfish, Technical assistance projects.

The study is concerned with use of freshwater fish for mink food. Feeding trails with presscake are described. Recommendations indicate that presscake offers considerable promise in the mink industry. Additional research is recommended. An implementation program makes technical assistance available to anyone showing interest in production or use of presscake. (BCF abstract).

PB-195 275/3 PC A04/MF A01
Bureau of Reclamation, Denver, Colo. Div. of General Research.
Water Measurement Procedures Irrigation Operator'S Workshop.
J. C. Schuster. Sep 70, 59p Rept no. REC-OCE-70-38

Keywords: *Irrigation, Hydraulics, Water flow, Measurement, Manuals, Meetings, Instructions, Water meters, Discharge, Orifice meters, Venturi, Weirs, Flow meters, Ultrasonic radiation, Radiation measuring instruments, *Water supply.

Water Measurement Procedures were written primarily as a teaching aid in presenting the fundamentals of water measurement to field personnel engaged in irrigation work. Technical material has been simplified to provide a clear understanding of water measurement devices and procedures. Basic hydraulics presented include the discharge equation, velocity head concept, orifice and weir relationships, and the effect of submergence. Factors affecting the accuracy of measurement such as work equipment, infrequent head measurement, and use of wrong measuring devices are analyzed. Commonly used devices and methods are discussed, including orifices, weirs, Venturi meters, Parshall and Venturi flumes, meter gates, constant head turnouts, and propeller meters; special devices and methods include vane deflection meters, acoustic and magnetic meters, and the dilution and radioisotope methods of measurement. Hints for troubleshooting poorly operating devices, suggestions to operators on how to do a good job, and a selected reading list for operators are given. (Author)

PB-195 201/0 PC A18/MF A01
Charles River Associates, Inc., Cambridge, Mass.
Choice of Transport Technology under Varying Factor Endowments in Less Developed Countries.
Final rept. 30 Jan 69-30 Jun 70
Paul Roberts. Jun 70, 409p* Rept no. CRA-3-138-30
Contract DOT-OS-A9-003
See also PB-195 292 and PB-195 293.

Keywords: *Transportation, Developing countries, Economic development, Project planning, Economic analysis, Management methods, Highway transportation, *Rail transportation, Factor analysis, Substitutes, Benefit cost analysis, Traffic engineering, Transportation models, *Air transportation, Food transportation, Technology.

The study was undertaken to assist developing countries in making economically rational choices in transport technologies--and thus to assist in their economic development and eventually to reduce the need for external capital assistance. The study uses cost simulation models for road, rail and air transport modes to develop guidelines for planners, taking account of the varying conditions of factor endowments (i.e., availabilities of labor, capital, and other resources) in the developing countries. Investment decisions involving choice of technology and mode may be expected to be sensitive to differences in prices of inputs. The sample problems of the report concern: A comparison of investment in a new rail facility and in a new road to serve a route between two traffic centers (nodes); and an evaluation of the various trade-offs involving vehicle technology and airport investment. (DOT abstract)

PB-195 757/0 PC A04/MF A01
Tri-County Regional Planning Commission, Lansing, Mich.
Comprehensive Development Plan, Bath Charter Township.
Apr 70, 64p

Keywords: Urban planning, Michigan, *Land use, Education, Recreational facilities, Public buildings, Public utilities, Roads, Bath Charter Township(Michigan), Shopping centers.

The report contains an analysis of Bath Charter Township in terms of historical growth trends, existing situation, and projected needs. Specifically the report contains six major sections. The first of these is the Planning Perspective which denotes goals and policies as well as the Township's existing situation. Assumptions and projections are included in the second section termed Dimensions of Future Change. The third section portrays the Land Use Plan while the fourth and fifth sections assess the future needs for community facilities, utilities and streets, and provides necessary policies to guide their development. Implementation procedures such as zoning and capital improvement programs are discussed in the sixth section of the report. Projections and policies are made for the year 1990. (Author)

PB-195 900/6 PC A02/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in the Federation of Malaysia. Increasing Fish Production by Improved Fishcultures, Phase I.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 18p
Contract AID/csd-1581
Revision of report dated 26 Feb 68.

Keywords: *Aquaculture, *Malaysia, *Fisheries, Surveys, Fresh water fishes, Research, Personnel, Laboratories, Tropical fish culture.

The report surveys the Fisheries Department of the Ministry of Agriculture which operates three marine stations and seven freshwater fish hatcheries. It covers the physical plant, water supply, facilities, staff and major research projects of the Tropical Fish Culture Research Station at Malacca, which is not part of the Fisheries Department. It discusses the problems involved in the future operation of the research station. (Author)

PB-195 901/4 PC A02/MF A01
Alabama Agricultural Experiment Station, Auburn.

Report of Fishcultural Investigations in East Pakistan. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 17p
Contract AID/csd-1581
Revision of report dated 30 Jan 68.

Keywords: Aquaculture, *Pakistan, *Fisheries, Surveys, Fresh water fishes, Production, Education, Universities, Research.

The report discusses the need for increased fish production as a means of increasing the supply of protein. It surveys the freshwater fisheries station at Chandpur and the features contributing to its unsuitability as a main research station. Covers the School of Fisheries at the East Pakistan Agricultural University at Mymensingh and the advantages and disadvantages of establishing a freshwater fisheries research station at the university. Information is included on the possible establishment of a brackishwater station and a Fisheries Development Corporation. Preliminary recommendations are given for a fishculture project in East Pakistan. (AID abstract)

PB-195 902/2 PC A02/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in Japan, Increasing Fish Production by Improved Fishcultures, Phase I.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 25p
Contract AID/csd-1581
Revision of report dated 15 Apr 68.

Keywords: Aquaculture, *Japan, *Fisheries, Surveys, Carp, Freshwater fishes, Research, Laboratories, History.

The report surveys several fisheries stations and farms primarily involved in carp culture in ponds and ricefields. Summary sheets are attached on carp culture in paddy fields in Nagano Perfecutre. Also given are an outline and short history of the Freshwater Fisheries Research Laboratory and includes the organizational structure, facilities and principal research projects. (AID abstract)

PB-195 903/0 PC A02/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in South Vietnam. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 20p
Contract AID/csd-1581
Revision of report dated 15 Feb 68.

Keywords: Aquaculture, *South Vietnam, *Fisheries, Surveys, Fresh water fishes, Proteins, Production, Lakes, Ponds, Education, Research.

The report contains general information on the present fish catch and suggests a means of increasing the availability of high quality protein in inland areas by increasing fish production in existing ponds and lakes. It includes data on the South Vietnam Directorate of Fisheries and the 14 inland and three brackishwater stations and describes the Revolutionary Development Training Center and its fisheries training ponds. Recommendations are made for a research and training program. (Author)

PB-195 904/8 PC A03/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in Taiwan. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 27p
Contract AID/csd-1581
Revision of report dated 17 Jun 69.

Keywords: Aquaculture, *Taiwan, *Fisheries, Surveys, Fishing grounds, Education, Universities, Mushrooms, Production.

The report discusses the importance of fisheries to Taiwan and the production from fish cultures. It gives data on fish farms, research stations, culture stations, and includes information on research experiments, training and facilities. It also covers the Taiwan chlorella Factory, mushroom culture, and fishery training at Taiwan National University. (AID abstract)

PB-195 905/5 PC A03/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in Thailand. Increasing Fish Production by Improved Fishcultures, Phase I.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 38p
Contract AID/csd-1581
Revision of report dated 15 Jan 68.

Keywords: Aquaculture, *Thailand, *Fisheries, Surveys, Fresh water fishes, Production, Inland waterways, Soils, Rainfall, Evapotranspiration, Research, Universities.

The report presents areas from which freshwater fish are available and on changes to future inland fish production because of the rapid increase in reservoir construction. It discusses the Northeast area giving data on soils, rainfall, evapotranspiration and fisheries stations, and analyzes the work of the Department of Fisheries and lists their freshwater and brackishwater fisheries stations. Data are included on the main station at Bangkhen, the College of Fisheries at Kasetsart University and the Khon Kaen Agricultural Research Center. Recommendations are made for a fishculture project in Thailand. (AID abstract)

PB-195 906/3 PC A03/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in India. Increasing Fish Production by Improved Fishcultures, Phase I.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 27p
Contract AID/csd-1581
Revision of report dated 16 Feb 68.

Keywords: Aquaculture, *India, *Fisheries, Surveys, Education, Research, Universities, Fishes, Production.

The report gives background information on fisheries in India. It surveys the Central Fisheries Station, a research substation and a brackishwater station. Data are included on fisheries education and state fisheries. It recommends a new location for a large freshwater fishcultural research station, establishment of several fishcultural substations, a survey to determine the desirability of a large brackish-seawater fishcultural research station, and one or more universities setting up a formal fisheries training program. (Author)

PB-195 907/1 PC A04/MF A01
Alabama Agricultural Experiment Station, Auburn.
Fishculture Survey Report for Ecuador. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and F. A. Pagan. 20 Dec 69, 51p
Contract AID/csd-2270

Keywords: Aquaculture, *Equador, *Fisheries, Surveys, Education, Nutrition, Geography, Management planning, Inland waterways, Coasts, Seafood, Food processing.

The report surveys the fisheries in the provinces of Pichincha, Manabi, De Los Rios and Del Guayas. It includes data on nutritional requirements, geography, status of fisheries, fisheries management, training and seafood processing plants. Reviews the inland fisheries and coastal aquaculture. Numerous recommendations are made for the improvement of the fishculture in the country. Discuss the FAO fisheries project to begin in January 1970. (AID abstract)

PB-195 908/9 PC A04/MF A01
Alabama Agricultural Experiment Station, Auburn.
Fishculture Survey Report of Colombia. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and F. A. Pagan. 1 Sep 70, 69p
Contract AID/csd-2270
Revision of report dated 10 Jan 70.

Keywords: Aquaculture, *Colombia, *Fisheries, Surveys, Fishing grounds, Management planning, Nutrition, Production, Fresh water fishes, Education, Statistical analysis.

The report contains material on the status of nutrition, fisheries statistics, fisheries management agencies, the FAO fisheries program, universities involved in fisheries research and training, freshwater fisheries and marine fisheries. Recommends several programs to improve production, exploitation and management of fishculture in Colombia. (Author)

PB-195 909/7 PC A04/MF A01
Alabama Agricultural Experiment Station, Auburn.
Report of Fishcultural Investigations in the Philippines. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, and D. D. Moss. 15 Aug 69, 62p
Contract AID/csd-1581
Revision of report dated 10 Oct 67.

Keywords: Aquaculture, *Philippines, *Fisheries, Surveys, Fishing grounds, Education, Statistical analysis, Fresh water fishes, Production, Cost analysis.

Describes the overall fisheries situation in the country. Reviews a proposed cooperative fishery project to establish both an adquate brackishwater and a freshwater fishcultural research station. Discusses best location and site for each station, and the agencies and institutions who will cooperate in the use of the stations. Descriptive data is given on the proposed freshwater pondculture station at Mindanoa State University including capital and operating costs. Similar materials are given for the proposed brackishwater pondculture stations at Leganes on Panay Island. (Author)

PB-195 910/5 PC A03/MF A01
Alabama Agricultural Experiment Station, Auburn.
Fishculture Survey Report for Paraguay.
R. O. Smitherman, and D. D. Moss. 20 Sep 70, 44p
Contract AID/csd-2270

Keywords: Aquaculture, *Paraguay, *Fisheries, Surveys, Geography, Economic conditions, Water resources, Education, Recreation, Lakes, Rivers, Ponds, Reservoirs.

The report reviews the geography, and the nutrional and economic aspects of the country. Discusses the water resources and the status of fisheries. It includes data on fisheries training and the agencies responsible for fisheries, and examines sport fishery and its potential for increasing tourism. It makes recommendations for advisory and training assistance. (AID abstract)

PB-195 912/1 PC A04/MF A01
Alabama Agricultural Experiment Station, Auburn.
Fishculture Survey Report for Panama.
R. O. Smitherman, and D. D. Moss. 1 Sep 70, 71p
Contract AID/csd-2270

Keywords: Aquaculture, *Panama, *Fisheries, Surveys, Nutrition, Education, Rivers, Lakes, Reservoirs, Ponds, Fresh water fishes, Shrimps, Catfishes, Honduras.

The report surveys the potential of fish culture as a source of low-cost protein and as the basis of a new industry. It includes data on nutrition, areas for pond construction, status of fisheries, government agencies responsible for fisheries, and fisheries training, and covers inland fisheries in rivers, lakes, reservoirs and ponds, as well as possible sites for inland research stations. It also describes culture of shrimp and catfish in Honduras. (AID abstract)

PB-195 913/9 PC A07/MF A01
General Oceanology, Inc., Cambridge, Mass.
Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume I. The Protein Situation in Korea and the Potential Role for Fish Protein Concentrate.
Final rept.
Oct 69, 145p Rept no. GO-8
Contract AID/csd-2158
Prepared in cooperation with the American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc.

Keywords: *Fish protein concentrates, *South Korea, Proteins, Developing countries, Food, Feasibility, Nutritive value, Nutritional deficiences, Food deprivation, Cost effectiveness, Food processing.

The report establishes that protein malnutrition exists in certain groups in Korea, and that fish protein concentrate (FPC) might contribute to ameliorating this shortage. Present economics and raw material shortages, however, mitigate against a self-priming commercial FPC operation in Korea today. However, some alternative paths for protein relief through FPC are possible. The report reviews protein nutrition, and the Korean protein system, and calculates the 'protein

gap' for the groups and determines the cost/effectiveness of protein fortification. It examines the feasibility of producing FPC locally, the implications of a protein supplement program on national nutrition policies and the cost of closing the protein gap. (Author)

PB-195 914/7 PC A08/MF A01
Alabama Agricultural Experiment Station, Auburn.
The Inland Fisheries Program of Thailand. Increasing Fish Production by Improved Fishcultures.
H. S. Swingle, G. B. Pardue, R. O. Smitherman, D. D. Moss, and H. R. Schmittou. 1 Jan 70, 165p
Contract AID/csd-2270

Keywords: Aquaculture, *Thailand, *Fisheries, Surveys, Research, Production, Universities, Education.

The report presents materials on fishery research programs, hatchery production and fish distribution. It also covers the status of fisheries extension and production programs, inland fisheries stations and units of the Department of Fisheries, the College of Fisheries of Kasetsart University, and the Northeast Agricultural Center. It recommends an expanded program of fisheries development with technical assistance and advanced training. (AID abstract)

PB-195 916/2 PC A06/MF A01
Alabama Agricultural Experiment Station, Auburn.
Fishculture Survey Report for West Central Africa, Increasing Fish Production by Improved Fish Production by Improved Fishcultures.
D. D. Moss, G. B. Pardue, and M. J. Danner. 30 Jun 69, 125p
Contract AID/csd-1581

Keywords: Aquaculture, *Subsaharan Africa, *Fisheries, Surveys, Fishes, Marketing, Nutrition, Economic analysis, Processing.

The report is a survey carried out from March 30 to May 27, 1969 with visits of about one week to each of the following countries in West Central Africa: Senegal, Central African Republic, Cameroon, Nigeria, Togo, Ghana and Ivory Coast. Summarizes for each country the present general economic status, status of present fisheries, fish marketing and processing methods, and nutritional status and fish consumption. Recommends the establishment of a cooperative program of fishculture development for Ghana. (Author)

PB-196 296/8 PC A20/MF A01
Agency for International Development, Washington, DC.
Marketing Stable Food Crops in Sierra Leone.
Rept. for Mar 66-Jun 67.
1967, 474p

Keywords: Farm crops, *Sierra Leone, Food, *Marketing, Economic development, *Vegetable oils, Nuts(Fruits), Root crops, *Rice, Production, Consumption, Processing, Labor relations, Statistical data, Prices, Cost engineering, *Crops, *Peanuts, Palm oil, Ground nuts, Cassava, Retail trade, Wholesale trade.

The document covers the general economic environment in which the marketing system of Sierra Leone operates, how the market system is organized and how it functions, price changes over time and between areas, marketing costs, and ways of improving the marketing system so that it will contribute more effectively to the economic development of the country. Special attention is given to the marketing of rice, palm oil, groundnuts and cassava. (AID abstract)

PB-196 306/5 PC A03/MF A01
Texas Tech Univ., Lubbock. Dept. of Agricultural Engineering.
Artificial Recharge in Water Resources Management.
Marvin J. Dvoracek, and Sam H. Peterson. 1970, 29p OWRR-B-041-TEX(4)

Keywords: Ground water recharge, Water supply, Arid land, *Water resources, Management planning, Water conservation, Recharge wells, Semiarid land, Irrigation, Agriculture, *Ground water, Sediments, Economic factors, Texas, Ogallala formation, Artificial recharge.

Water resources for arid and semiarid regions of the United States are only marginal at the present time and new sources of water are no longer available. Artificial recharge techniques are presented as one method of partially alleviating the problem. Artificial recharge is presented in the context of the water depletion of the Ogallala formation on the High Plains of Texas. There, as in the United States as a whole, irrigated agriculture is the major water user. Several recharge mechanisms are discussed, such as recharge wells, shafts, holes, pits, trenches, rubble cones, and water spreading. All of the methods share the problem of sediment content in water used for recharge, but the problem is not insurmountable. In some cases economic value of artificially recharged water has already outweighted the limitations. (WRSIC-abstract)

PB-196 340/4 PC A03/MF A01
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
The Continued Development and Field Evaluation of the Aid Hand-Operated Water Pump.
Final rept.
R. D. Fannon, Jr, and D. W. Frink. 28 Aug 70, 42p
Contract AID/csd-2174

Keywords: Piston pumps, Design, Well pumps, Water distribution, Developing countries, Plungers, Valves, Bushings, Materials, Cost estimates, *Water pumps, Hand operated piston pumps.

The document based on research carried out over a period of several years on the development of a simple, efficient, hand-operated piston pump for use in developing countries. It covers plunger-valve design, selection of optimum cup material, and the evaluation of cylinder coatings, foot valves, and handle pins and bushings. (AID abstract)

PB-196 341/2 PC A05/MF A01
Joint Development Group, Saigon (Republic of Vietnam).
Present Situation and Possibilities of Postwar Development of Inland-Fisheries in the Mekong delta.
Nov 68, 96p Rept no. Working Paper-42
Contract AID/fe-291

Keywords: Aquaculture, Vietnam, Economic development, *Fisheries, Fishing grounds, Hydrographic surveys, Ichthyosis, Rivers, Food processing, Agriculture, Mekong River, Mekong Delta, Fish marketing, *South Vietnam.

The report describes the hydrographical and ichthyological features of the Mekong. Discusses the different methods of exploitation of natural water bodies and ponds, the processing and stocking of fishery products, the transportation and marketing aspects. Recommends the increase of fishing production to keep pace with population growth, raising the income of rural people, and strengthening the agricultural economy. Analyzes the interaction and integration of fisheries activities in the post-war development program. Appendices include a list of fish species in river and flooded areas of SVN and a check list of fish-culture species cultivated in SVN. A one-page bibliography is included. (Author)

PB-196 350/3 PC A05/MF A01
Agency for International Development, Washington, D.C. Office of Human Resources and Social Development.
Water and Man'S Health.
Community water supply technical series
Arthur P. Miller. Apr 62, 97p Rept no. CWS-TS-5

Keywords: *Water pollution, Public health, *Water resources, Public health, *Diseases, Infectious diseases, Parasites, Water quality, Water supply, Radioactive wastes, Water consumption, Chemical compounds, Contaminants, Water chemistry, Toxicity, Humans, Water treatment, Mortality, *Health.

Introductory sections of this booklet discuss the importance of water to human beings. Other sections consider parasites and water, relationship of water to other diseases and to chemical substances, particularly radioactive materials. (AID abstract)

PB-196 352/9 PC A04/MF A01
Joint Development Group, Saigon (Republic of Vietnam).
A Description of Ocean Fish Marketing in Saigon.
Report for May-Jun 68
Nguyen Van Thuan, Nguyen Cao Dan, and Larry L. Pressler. Jun 68, 62p Rept no. Working Paper-24
Contract AID/fe-291

Keywords: Marine fishes, *Marketing, Economic surveys, *South Vietnam, Commerce, Seafood, Cost engineering, Transportation, Cooperation, Interviews, Personnel, Economic development, *Fishes, Saigon(South Vietnam), Wholesale trade, Retail trade, Cooperatives.

The report outlines the marketing aspects of ocean fish in the Saigon-Cholon urban complex based on four weeks of research visiting wholesale and retail markets, and interviews with dealers, boatowners, truckowners, police and consumers. It includes data on pricing, operations of wholesalers, transportation costs and retailers. Appendices contain information on the fishing cooperatives at Rach Gia and Ham Tan. (AID abstract)

PB-196 355/2 PC A03/MF A01
Auburn Univ., Ala. International Center for Aquacultures.
Fishculture Survey Report for Peru.
R. O. Smitherman, and D. D. Moss. 30 Sep 70, 50p
Contract AID/csd-2270

Keywords: Aquaculture, *Peru, *Fisheries, Surveys, Nutrition, Trout, Geography, Economic factors, Education, Bibliographies, Lake Titicaca.

The report surveys two regions to assess the status of trout fishery of Lake Titicaca and to provide technical advice on the development of warm-water aquacultures in the Amazonas Region. It includes data on geography, aspects of nutrition and economics, status of fisheries, government agencies responsible for fisheries, fisheries training and inland fisheries. Appendixes include list of ornamental fishes exported from Amazonas and a list of fishes in the Iquitos area. (AID abstract)

PB-197 157/1 PC A10/MF A01
Massachusetts Inst. of Tech., Cambridge. Sea Grant Project Office.
The Economics of Fish Protein Concentrate.
J. W. Devanney, III, and G. Mahnken. 20 Nov 70, 202p* Rept no. MITSG-71-3

Keywords: *Fish protein concentrates, Economics, Nutrition, Developing countries, Feasibility, Econometrics, Benefit cost analysis, Cost effectiveness, *Chile, Standards, Requirements, Analysis of variance, Sea Grant program.

The report examines the economic feasibility of fish protein concentrate in two contexts: as a nutritional supplement in the diet of a developing country, and as a competitive food additive in the United States. The report examines the subject with special reference to the role that the United States Government should play in the development of FPC. Fish protein concentrate designates any stable powder resulting from the removal of oil and water from fish which is aimed at human consumption. When we are referring to a particular variety of FPC, we will attempt to make this specialization clear either explicitly or by the context.

PB-197 758/6 PC A09/MF A01
Greenleigh Associates, Inc., New York.
An Evaluation of Consumer Action and Urban Cooperative Programs. Volume I: Summary of Findings
Final rept. 1 Jun 69-31 Sep 70.
Feb 71, 185p* OEO-LN-862
Contract OEO-B99-4873
See also Volume 2, PB-197 759.

Keywords: Purchasing, Coordinated procurement, Consumers, Economic factors, Cooperation, Financing, Project planning, Economic development, Marketing, Credit, Evaluation, Low income consumers, Credit unions, *Cooperatives, Consumer's cooperatives, Marketing cooperatives, Buying clubs, Small merchants cooperatives, Cooperative enterprises, Service cooperatives.

The report presents a study to determine the effectiveness of OEO's Consumer Action and Urban Cooperative Program. The goals of this program were to aid low-income consumers through the establishment of

cooperatives and credit unions and to encourage the involvement of outside capital in economic enterprises. (OEO abstract)

PB-197 759/4 PC A12/MF A01
Greenleigh Associates, Inc., New York.
An Evaluation of Consumer Action and Urban Cooperative Programs. Volume II: Individual Project Reports
Final rept. 1 Jun 69-31 Sep 70.
Feb 71, 269p* OEO-LN-863
Contract OEO-B99-4873
See also Volume 1, PB-197 758.

Keywords: Purchasing, Coordinated procurement, Consumers, Economic factors, Cooperation, Financing, Project planning, Economic development, Marketing, Credit, Evaluation, *Cooperatives, Credit unions, Low income consumers, Consumer's cooperatives, Marketing cooperatives, Service cooperatives, Cooperative enterprises, Buying clubs.

Evaluations are given of the following individual projects: Consumer action program for Bedford-Stuyvesant, Inc. (CABS); Lower east side economic development association for cooperatives (LESEDAC); New York institute for consumer education and development (NYI); Tulsa economic opportunity task force; Metropolitan cooperative services, inc.; Newark personal loan program (NPLP); Bay area neighborhood development foundation; Rural action for better consumer development; Watts labor community action committee; Pilsen neighbors community council; Action for Boston community development; Martin Luther King/Arthur Capper Store; Kleberg county consumers', inc.; Grocery bag store; Detroit consumers federal credit union.

PB-197 992/1 PC A03/MF A01
Puerto Rico Univ., Mayaguez. Agricultural Experiment Station.
Water Requirements of Sugarcane Under Irrigation in Lajas Valley, Puerto Rico
Roberto Vazquez. Jul 70, 42p Bull-224, UPRICO-WRRI-FR-71-5
Also available as Rept. no. OWRR-A-005-PR(1).

Keywords: *Sugarcane, Water supply, *Irrigation, *Puerto Rico, Soil water, Efficiency, Methodology, Fertilizers, Nitrogen inorganic compounds, Production, Lajas Valley.

Field experiments were conducted in Puerto Rico at the Lajas Substation to determine optimum soil moisture conditions necessary to produce maximum sugarcane and sugar yields. Twenty irrigation regimes were tested. Some of the plots were irrigated frequently and others were irrigated less frequently in the active root zone throughout the growing period. Nitrogen fertilizer treatments were tested at the rate of 200 and 300 pounds per acre per crop. Data were taken for a 13-month plant cane and two 12-month ratoons of sugarcane. The plant cane used more water than the ratoon crop. The mean consumptive use per day was 0.160 inch for plant can and 0.154 inch for ratoon in the frequently irrigated plots throughout the growing period. The average of the combined yields of a plant cane and two ratoons were 73.67 tons of sugarcane and 7.80 tons of sugar per acre in the frequently irrigated plots and 59.37 tons of sugarcane and 6.40 tons of sugarcane per acre in the less frequently irrigated plots. (WRSIC abstract)

PB-198 125/7 PC A06/MF A01
Robert S. Kerr Water Research Center, Ada, Okla. Treatment and Control Research Program.
Water Quality Management Problems in Arid Regions
Water pollution control research series
James P. Law, Jr, and Jack L. Witherow. Oct 70, 109p* FWQA-13030-DYY-06/69

Keywords: *Arid land, Water pollution, Nitrates, Sewage treatment, Water reclamation, Agricultural wastes,Irrigation, Denitration, Algae, Salinity, Desalting, *Water quality, Industrial wastes, Ground water, Chemical removal(Water treatment).

An international conference entitled 'Arid Lands in a Changing World' sponsored by the American Association for the Advancement of Science Committee on Arid Lands and the University of Arizona, was held at Tucson in June, 1969. The report presents a selected group of the papers presented at those sessions which should benefit those concerned with water quality management problems in arid regions. The title of the papers included in this report are as follows: Nitrate removal from agricultural wastewater; the effects of salinity standards on irrigated agriculture in the Colorado River basin; Problems of pollution of irrigation waters in arid regions; Water quality requirements and re-use of wastewater effluents; Salinity control in return flow from irrigated areas--a demonstration project; Water quality control problems in inland sinks; Natural pollution in arid land waters; Distillation of wastewaters: A water resource for arid regions; and Animal waste runoff--a major water quality challenge. (WRSIC abstract)

PB-199 799-T PC A04/MF A01
Bureau of Commercial Fisheries, Washington, DC. Office of Foreign Fisheries (Translations).
Manual on the Biotechnology of the Propagation and Rearing of Phytophagous Fishes
May 71, 52p
Trans. of Rukovodstvo po Biotekhnike Pazvedeniya i Vyrashchivaniya Rastitelnoyaknykh Ryb, Moscow, 1970 72p, by Robert M. Howland.

Keywords: *Fishes, Aquaculture, Manuals, Feeding habits, Nutrients, Algae, Phytoplankton, Breeding, Embryology, Physiology, Translations, Zooplankton, Phytophagous fishes, Cyprinidae.

The fareastern phytophagous fishes - the white and variegated silver-carps, and the white amur - are new objects of fish culture. Despite the brief period of their propagation here and the fact that experimentation concerning their commercial adoption is far from complete, these fishes comprise an ever greater share of the fish production generated at fish farms. In such areas as the Krasnodar region and the Uzbek SSR, they now comprise about one-half of the market fish reared. Pond culture currently is undergoing a fundamental reorganization, transforming from the monoculture of carp to the more highly productive and economically profitable polyculture. This manual considers the cumulative experience and deals with the latest questions on the propagation and rearing of phytophagous fishes. (Author)

PB-201 729/1 PC A04/MF A01
Mississippi State Univ., State College. Water Resources Research Inst.
Community Organization and Rural Water System Development
John H. Peterson, Jr. 1971, 60p OWRR-B-005-MISS(1)

Keywords: *Water supply, Rural areas, Communities, Community development, Urban planning, Rural water system development, Community organization.

Rural communities in a representative county were studied to determine the range of community experiences in water system development and to establish the relationship between community organization and water system development. (WRSIC abstract)

PB-202 778-1 PC A14
MITRE Corp., McLean, VA.
A Technology Assessment Methodology. Volume I. Some Basic Propositions
Final rept.
Martin V. Jones. Jun 71, 307p* Rept no. MIR-6009-1
Contract OST-26
Also included in PB-202 778-Set, See also PB-202 778-2.

Keywords: Research, Assessments, Research management, Assessments, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, Project management, Methodology, *Research and development, *Technology assessment.

This is one of six reports on the subject of technology assessment prepared by MITRE for the Office of Science and Technology, Executive Office of the President. The purpose of this project was to develop a standard, structured method for making studies directed toward anticipating and influencing the societal impacts of new technology applications. This volume describes the standard methodology that was developed. The other volumes are 'pilot' assessment studies covering particular fields of technologies that were conducted to help test, develop, and illustrate the standard assessment methodology. (Author)

PB-202 778-2 PC A10
MITRE Corp., McLean, VA.
A Technology Assessment Methodology. Volume II. Automotive Emissions
Final rept.
Willis E. Jacobsen. Jun 71, 205p* Rept no. MTR-6009-2
Contract OST-26
Also included in PB-202 778-Set, See also PB-202 778-1 and PB-202 778-3.

Keywords: *Air pollution, Assessments, Exhaust gases, Automobile engines, Forecasting, Social change, Benefit cost analysis, Cost effectiveness, Decision making, Methodology, Public health, Internal combustion engines, External combustion engines, Environmental surveys, Government policies, Economic analysis, Highway transportation, Abatement, Mass transportation, Monitors, *Automobiles, *Technology assessment, Automobile exhaust, Hybrid vehicular propulsion.

The pilot study on automotive emission control is one in a series of five, each addressing different technologies. A framework for appraising societal influences of control strategies (technological and nontechnological) for reducing noxious automotive emissions is developed and illustrative examples, based on a proposed cost/benefit model, are presented. (Author)

PB-202 778-5 PC A10
MITRE Corp., McLean, VA.
A Technology Assessment Methodology. Volume V. Mariculture (Sea Farming)
Final rept.
Robert C. Landis. Jun 71, 205p* Rept no. MTR-6009-5
Contract OST-26
Also included in PB-202 778-Set,See also PB-202 778-4 and PB-202 778-6.

Keywords: Aquaculture, Assessments, Developing countries, Benefit cost analysis, Forecasting, Environmental surveys, Economic analysis, Decision making, Methodology, Human nutrition, Cost effectiveness, International trade, Proteins, Water pollution, Infant nutrition, Social change, Models, Government policies, Fisheries, *Technology assessment.

A general technology assessment methodology is used to determine the impacts of mariculture on the developing countries. The technology is confined to application in coastal and brackish waters. A quantitative impact analysis of economic and social factors is shown for the years 1975-1989. Various action options are offered and a revised impact forecast is given for increased impact on the malnutrition problem. The problems and constraints to accelerated mariculture application are analyzed, and a forecast of 20 million tons of mariculture production in 1985 is made. Also, a subjective probability of which countries will apply mariculture is given. (Author)

PB-202 778-6 PC A15
MITRE Corp., McLean, VA.
A Technology Assessment Methodology. Volume VI. Water Pollution: Domestic Wastes
Final rept.
Victor D. Wenk. Jun 71, 331p* Rept no. MTR-6009-6
Contract OST-26
Also included in PB-202 778-Set,See also PB-101 778-5 and PB-202 778-7.

Keywords: *Sewage treatment, Assessments, Water pollution, Sewage, Benefit cost analysis, Septic tanks, History, Forecasting, Social change, Environmental surveys, Decision making, Methodology, Economic analysis, Government policies, Cost estimates, Soil chemistry, Abatement, Nutrients, Cost effectiveness, Chemical removal(Sewage treatment), Models, Land use, Ground water, *Technology assessment.

A general technology assessment methodology is used to determine the impacts of widespread use of individual home sewage treatment technology during the 1970-1989 time period. The effects of varying rates of diffusion of this technology are analyzed in terms of selected measures of economic and environmental impact. Social and institutional impacts are discussed.

Various action options available to identified interest groups are analyzed in terms of their effect upon technology diffusion rates and specific impact areas. The normative nature of this technology assessment called for the use of a dynamic interactive model of the technology diffusion process. (Author)

PB-202 778-7 PC A03
MITRE Corp., McLean, VA.
A Technology Assessment Methodology. Project Summary
Final rept.
Martin V. Jones. Jun 71, 35p* Rept no. MTR-6009-7
Contract OST-26
Also included in PB-202 778-Set, See also PB-202 778-6.

Keywords: Research, Assessments, Forecasting, Social change, Cost effectiveness, Benefit cost analysis, Decision making, Social sciences, *Sewage treatment, *Aquaculture, Enzymes, *Air pollution, Methodology, *Research and development, *Technology assessment.

The paper summarizes the findings of an exploratory technology assessment project jointly sponsored by the Office of Science and Technology, Executive Office of the President, and The MITRE Corporation. The objective of the project was to develop an analytical framework and a structured procedure that could be used for anticipating the societal impacts of major technologies. Detailed findings are reported in six volumes. (Author)

PB-202 936/1 PC A14/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Response and Energy-Dissipation of Reinforced Concrete Frames Subjected to Strong Base Motions
Civil engineering studies
Polat Gulkan, and Mete A. Sozen. May 71, 304p
Rept nos. Structural Research Ser-377, UILU-ENG-71-2013
Grant NSF-GK-1118

Keywords: *Reinforced concrete, Dynamic response, Concrete structures, Earthquakes, Computerized simulation, Earth pressure, Static loads, Framed structures, Environment simulators, Damping capacity, Frequency response, Earthquake resistant structures, *Earthquake engineering, *Concrete.

The report contains tests and analyses of reinforced concrete frames subjected to simulated earthquake motions. (Author)

PB-203 326/4 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Environmental Considerations for Construction Projects
Jul 71, 29p Rept no. TA/OST-71-1

Keywords: Construction, *Environmental surveys, Project planning, Highways, Harbor facilities, *Buildings, Airports, Irrigation systems, Dams, Electric power plants, Petroleum industry, Mining, Smelting, Paper industry, Industrial plants, Fertilizers, Sewage treatment, Air pollution, Water pollution, Noise reduction, Solid waste disposal.

Environmental considerations for twelve categories of construction projects are presented, in the form of key questions, designed to serve as general points of departure for analyzing the potential environmental consequences of proposed projects. Projects discussed are: road construction; port and harbor development; airports; irrigation systems; dam construction; power plants; petroleum-petrochemical industry; mining; smelting; pulp and paper industry; fertilizer plants; and sewage treatment.

PB-203 327/2 PC A11/MF A01
American Univ., Washington, D.C.
Computer Technology in Developing Countries. Proceedings of Symposium Held at American University, Washington, D.C. on 22-23 March 1971
Final rept.
Mar 71, 231p* TA/OST-AU-71-1
Contract AID-csd-2905

Keywords: Data processing, Utilization, Developing countries, Computer programming, Computer systems hardware, Specialized training, Management planning, Instructions, Cost analysis, Foreign aid, Meetings, *Computers.

The report includes papers presented at a two-day symposium on seven areas of the use of computer technology in developing countries and transcripts of the discussions of each topic. A summary of the symposium was prepared by Professor Lowell H. Hattery of the American University. (Author)

PB-203 379/3 PC A03/MF A01
National Academy of Sciences, Washington, DC.
International Aspects of Man's Effect Upon Environment
Summary rept.
Roger Revelle. Jan 70, 29p TA/OST-NAS-70-27
Contract AID/csd-1122

Keywords: Foreign aid, *Environmental surveys, Pollution, Foreign aid, Developing countries, International assistance, Legislation, Pesticides, Dams, Reservoirs, Water quality, Ecology, Government policies.

The summary on Environmental Aspects of Foreign Assistance Programs by the Agency for International Development (AID) presents conclusions on the following topics: Which aspects of AID international assistance have the possibility of creating problems of environmental degradation; Which of the problem areas should receive priority attention; How may AID strengthen the capabilities of the United States and the developing countries in dealing with environmental problems. A list of fourteen major areas in which man is having seriously deleterious effects upon his environment is attached.

PB-203 608-D PC A02
Agricultural Research Service, Washington, DC.
Boll Weevil Control Program (Cooperative Diapause Control Program), Texas and Mexico
Draft environmental impact statement.
22 Oct 71, 18p

Keywords: *Environmental surveys, Pest control, Texas, Mexico, Environmental surveys, Insect control, Cotton plants, Animal migrations, Insecticides, Toxicology, Birds, Bees, Rodents, Vegetation, *Pesticides, Environmental impact statements, International cooperation, Malathion, Boll weevils, Aldicarb.

The project is concerned with a pesticide program on the Texas-Mexico border, for the primary purpose of boll weevil control. Adverse impact effects anticipated include the effects of damage to nontarget insects and other organisms.

PB-203 844/6 MF A01
Hawaii Univ., Honolulu.
Salinity Tolerances of Certain Tropical Soils and Relationships Between Sodium Ion Activities and Soil Physical Properties
Research and development progress rept.
S. A. El-Swaify, L. D. Swindale, and G. Uehara. Mar 69, 55p OSW-PR-419
Contract DI-14-01-0001-673
Paper copy available from GPO as I1.88:419.

Keywords: Soil properties, Tropical regions, Irrigation, *Soils, Salinity, Deterioration, Demineralizing, Salt water, Sodium inorganic compounds, Calcium inorganic compounds, Magnesium inorganic compounds, Soil water, Physical properties, Ions, Acidity, Colloiding, Percolation, Hawaii, Tropical soils.

Two tropical soils from Hawaii were tested for salinity tolerances, the ability of the soils to resist physical deterioration by saline waters. Hydraulic conductivity measurements showed that presently permissible limits of salinity and sodium in irrigation water can be safely raised because significant hazardous physical conditions are not likely to occur. Both soils possess high resistance to detrimental peptization even when exposed to extreme sodic conditions. The original acidities of soils are highly resistant to change under leaching. Neither soil had a tendency to accumulate soluble salts by extraction from percolating saline waters. The direct determination of ionic activities for sodium, calcium and magnesium ions as a new and more fundamental tool in soil salinity work is discussed. (Author)

PB-204 408/9 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Water Quality Standards and International Development
Oct 71, 34p Rept no. TA/OST-71-4

Keywords: *Water quality, Standards, United States, Water quality, Developing countries, Potable water, Surface waters, Water supply, Chemical analysis, Bacteria, Radioactive contaminants, Water pollution, Control, Planning.

The report summarizes progress to date in establishing water quality standards in the United States and in developing countries. Its purpose is to assist those concerned broadly with environmental policies in developing countries to better understand past efforts and future needs in this field. (Author)

PB-204 519/3 PC A06/MF A01
Illinois Inst. for Environmental Quality, Chicago.
Septic Tanks and the Environment
Final rept.
J. W. Patterson, R. A. Minear, and T. K. Nedved. Jun 71, 105p* Rept no. IIEQ-71-2

Keywords: *Septic tanks, Reviews, Public health, Water pollution, Performance evaluation, Legislation, Illinois, Standards, History, Environmental surveys, Sludge disposal, Nitrates, Soil properties, Percolation, Nitrogen inorganic compounds, Phosphorus inorganic compounds, *Health, *Sewage disposal.

The report reviews and evaluates the available literature on septic tanks, and influence of septic tanks on public health and environmental quality. The consistently poor performance of septic tanks indicates that other waste disposal methods are necessary in densely populated areas and that more rigorous regulation of design criteria, installation, and operation are required in sparsely inhabited areas suitable for septic tank installations. The report is intended to form the basis for appropriate administrative or legislative action in Illinois. Its bibliography contains 127 items. (Author)

PB-205 287/3 PC A15/MF A01
Agency for International Development, Washington, DC.
Progress Through Modern Processes and Tools
George D. Thomas. Mar 70, 332p* TA/OST AN-70-3-1

Keywords: *Foundries, Production methods, Manuals, *Machine tools, Design, Production control, Quality control, Cost engineering, Drafting(Drawing), Tooling, Steel, Materials specifications, Jigs, Fixtures, Clamps, Bushings, Carbide tools, Dies, Die casting, Molding machines, Foundry engineering.

Basic materials are presented which are intended to help acquaint production planners and key production workers with the proper use of modern production techniques and the proper design and manufacture of standard production tools. Experience has shown that these standard techniques and tools will aid in the improvement of production efficiency, reduction of costs, improvement of quality, and making of component parts interchangeable. The specific topics covered include: Organizing for the specific control of quality and production; Cost reduction; Drafting room practice and tool engineering data; Steel specifications--heat-treatment and uses; Jigs and fixtures; Standard clamps; Standard bushings; Carbide cutting tools; Steel stamping dies; Die casting instructions; Compression and transfer molding equipment (plastic dies); Foundary equipment and processes.

PB-205 761/0 PC A07/MF A01
Trust Territory of the Pacific Islands, Saipan, Mariana Islands. Economic Development Div.
Copra Processing in the Trust Territory. A Report to the Congress of Micronesia
William H. Stewart. 1971, 138p

Keywords: Mariana Islands, Copra processing, Economic development, Vegetable oils, Industrial plants, Market research, International trade, Revenue, Food consumption, *Coconuts, Coconut meal.

The report analyzes the factors involved in processing copra in the Trust Territory into crude coconut oil and

copra cake. The report is more than a feasibility analysis in that it discusses the economics of manufacturing or processing in the Trust Territory. (Author)

PB-205 823/8 PC A02/MF A01
Kansas Water Resources Research Inst., Manhattan.
A New Type of Disinfectant for Water Supplies
Completion rept. Mar 69-Jun 71
Jack L. Lambert, and Louis R. Fina. Jun 71, 20p
Contrib-78, OWRR-A-028-KAN(2)
Contract DI-14-01-001-1635

Keywords: Disinfectants, *Water supply, Iodides, Disinfectants, *Water treatment, Water pollution, Contaminants, Viruses, Bacteria, Bacillus, Anion exchanging.

Triiodide combined with strong base anion exchange resins forms stable, nearly insoluble, complexes that have remarkable disinfecting capabilities. Complete kills are effected with water suspensions of virus (both DNA and RNA) Gram negative and Gram positive bacteria (whether capsulated or not), and viability of sporulating Bacilli species is reduced up to 99.9%. Water to be treated is simply passed through a column of the resin-complex. The bacteria or virus, shown by 14C or 3H tracers, pass through the column and are not filtered out. Kill is immediate and irreversible. No I2, I3(-), IO(-), IO(3(-), and IO4(-) are detected when the cadmium iodide-linear starch reagent method was used. Iodide, the halide form, was found in amounts ranging from 0.2-0.5 PPM. This is well below the taste threshold and indeed may be considered beneficial in iodine deficient areas.

PB-206 514/2 PC A05/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Cooperative Housing, Ideas and Methods Exchange No. 52
J. Robert Dodge. Jul 71, 76p

Keywords: *Housing, *Cooperatives, Urban planning, Residential buildings, Economic development, Classifying, Construction, Finance, Management planning, Income, Education, Organizations, Management, Cooperative housing.

Because the cooperative movement as an economic and social phenomena has grown and proliferated to such an extent that it has assumed world-wide importance and because of the interest in cooperative housing in developing countries, the subject has been explored in greater depth and from a different point of view than in an earlier publication. Ideas gleaned from experiences in both industrialized and developing countries have been included as a guide to those interested in undertaking cooperative housing programs. (Author)

PB-206 539/9 PC A20/MF A01
Central Treaty Organization, Ankara, (Turkey).
CENTO Symposium on Hydrology and Water Resources Development. Held in Ankara, Turkey, 7-12 February 1966
Dec 66, 464p TA/OST-AN-66-2-1

Keywords: *Hydrology, *Water resources, Economic development, Economic factors, Ground water, Surface waters, Developing countries, Meetings, Turkey, Water resources development.

The document presents the papers delivered at a symposium on hydrology and water resources development held in Ankara, Turkey, 2-12 February 1966. It is felt that the meeting marked a step forward in considering the extent and need to develop knowledge of a region's water resources as a vital foundation for economic development programs. The general topics covered include water resources development, surface hydrology, groundwater hydrology, and agricultural and industrial problems. (Author)

PB-206 540/7 PC A11/MF A01
State Univ. of New York, Albany. School of Library Science.
Manual on Book and Library Activities in Developing Countries
Stanley A. Barnett, and Roland R. Piggford. Jun 69, 243p TA/OST-AN-69-6-1
Contract AID/csd-2156

Keywords: Books, Developing countries, *Libraries, Economic development, Publishing, Printing, Manuals.

This guideline manual is intended to provide assistance to those interested in conceiving and framing sound and useful book activities for the enhancement of economic development. It is a compendium of ideas, techniques, and procedures regarding book and library activities that have been formulated and/or tested in developing countries during recent years. Specific areas of coverage include: The role of books in the national growth process; summaries of the major book needs in specific developing areas; summary of international book activities by government and private organizations; book subsidy programs and projects; library development activity and training; book and periodical procurement services; stimulating local book industries; regional book development or translation centers; textbook programs; building and strengthening book-related institutions; and financing book industry development.

PB-206 541/5 PC A17/MF A01
Central Treaty Organization, Ankara (Turkey).
CENTO Conference on Engineering Education Held in Isfahan, Iran on November 7-13, 1966
Nov 67, 389p TA/OST-AN-66-11-1

Keywords: Engineering education, *Education, Meetings, Developing countries, Economic development, Engineering schools, Turkey, Iran.

The document is comprised of papers presented at a conference on engineering education. The purpose of the conference was to take cognizance of the fact that an adequate reservoir of well qualified engineers and technicians is basic to developed and developing industrial economies. Specific areas covered include: the need for engineers and technicians; present systems of engineering education; training of engineering technicians; undergraduate engineering curricula; teaching methods and aids; relations of engineering education with industries and government; professional programs related to a region's needs; graduate engineering education; role of research in engineering education; duties, qualifications and preparation of teachers.

PB-206 549/8 PC A14/MF A01
Kaiser Engineers, Oakland, CA.
A Manual on Water Desalination. Volume I. Technology
Apr 67, 322p TA/OST-AN-67-4-1
Contract AID/csd-1440
See also Volume 2, PB-206 550.

Keywords: *Desalination, Desalting, Reviews, Manuals, Distillation, Freezing, Electrodialysis, Osmosis, Evaporation, Electric power plants, Nuclear power plants, Materials recovery, Brines, Industrial plants, Industrial engineering, Chemical engineering, *Water supply, Feasibility, Design criteria, Developing countries, Electrodialysis desalination, Reverse osmosis desalination, Verticle tube evaporation, Multistage flash distillation, Vapor compression distillation, Solar distillation, Vacuum freeze vapor compression desalination.

The manual has been prepared as a guide in evaluating the feasibility of desalination in water-short areas where desalination may be competitive with other water sources. The manual is divided into two volumes, which may be used independently of each other. Volume I includes a discussion of the state of the art of the major desalination processes. Specific topics include: Saline water phenomena and definitions; state of the art of distilllation, freezing and crystallization, electrodialysis, and reverse osmosis processes; description of typical plants; dual-purpose electric power generation-water desalination plants; recovery of chemicals as by-products; summary of major conceptual design studies.

PB-206 550/6 PC A09/MF A01
Kaiser Engineers, Oakland, CA.
A Manual on Water Desalination. Volume II. Economics
Apr 67, 179p TA/OST-AN-67-4-2
Contract AID/csd-1440
See also Volume 1, PB-206 549.

Keywords: *Desalination, *Water supply, Desalting, developing countries, Water resources, Economic development, Feasibility, Questionnaires, Cost estimates, Sea water, Brackish water, Solubility, Capital costs, Operating costs, Site surveys.

The report provides guidelines for the initiation of a program for defining and solving the water shortage problems of a particular nation or region using desalination. Its scope includes the formulation of a logical and feasible water development plan; the accomplishment of preliminary feasibility studies on the possible solutions, and the determination of the most promising course of action based upon the results of these studies; and the accomplishment of a detailed engineering feasibility and economic study of the possible alternatives. A series of estimating aids and nomographs for determing capital costs of desalination plant facilities is included. (Author)

PB-206 698/3 PC A03/MF A01
General Electric Co., Schenectady, NY. General Engineering Lab.
Refrigeration-Cooling Systems for Rural Communities in Developing Countries
Dec 62, 45p TA/OST-AN-62-12-1
Contract AID-REPAS-1

Keywords: Developing countries, *Food storage, Refrigerating, Evaluation, Ice refrigeration, Controlled atmospheres, Steam jet refrigeration, Thermoelectric refrigeration, Transport refrigeration, Rural areas.

A review and evaluation is provided of alternative refrigeration-cooling systems for application in the rural areas of newly developing countries. The available equipment suited to the needs of these countries is identified, and development opportunities for improved equipment systems are delineated. The scope of the document is restricted to community or village sized facilities for fresh food preservation. A list of equipment manufacturers is included. (Author)

PB-206 700/7 PC A08/MF A01
Central Treaty Organization, Ankara (Turkey).
CENTO Conference on Industrial Vocational Education Held in Ramsar, Iran on June 23-30, 1968
Apr 69, 171p TA/OST-AN-69-4-1

Keywords: *Training, *Vocational guidance, Industrial training, Developing countries, Planning, Instructors, Counseling, Meetings, Turkey, Vocational education.

The report provides the texts of most of the papers presented at a conference on the problems of vocational industrial education. Some of the topics covered are: manpower planning and vocational education; elements of a coordinated national program; education and training patterns for developing manpower; developing effective programs for vocational education and training; structure and use of advisory committees on vocational education; programs for preparing teachers; occupational testing, guidance, counselling, and follow-up.

PB-206 701/5 PC A22/MF A01
Central Treaty Organization, Ankara (Turkey).
Seminar on Evaluation of Water Resources With Scarce Data, Held in Tehran, Iran on March 4-8, 1969
Final rept.
Jan 70, 515p TA/OST-AN-70-1-2

Keywords: *Water resources, Evaluation, *Hydrology, Developing countries, Meetings, Stream flow, Watersheds, Droughts, Water quality, Surface water runoff, Agriculture, Water supply, Water storage, Reservoirs, Iran.

The report is comprised of papers, orginally presented at a seminar held 4-8 March 1969 in Tehran, Iran, which deal with the evaluation of water resources within the limitations imposed by this scarcity of data. Some of the topics covered are: Minimal data gathering procedures; Maximum utilization of scarce data in hydrological design; Preparation of long term flow sequence from short term records; Drought frequency analysis by means of synthetic flow sequences; Estimation of factors controlling streamflow in areas of limited data; Land treatment in agricultural watershed hydrology research. (Author)

PB-206 775/9 PC A12/MF A01
Continental-Allied Co., Inc., Washington, D.C.
Five Industries for the Central African Republic
Erwin J. Sholton, and Edward A. Tenenbaum. Nov 65, 267p TA/OST-AN-65-11-1
Contract AID/afr-288

Keywords: *Food products, *Batteries, *Asbestos, Developing countries, Industries, Economic development, Surveys, Profits, Investments, Demand(Economics), Capital, Marketing, *Central African Republic.

Isolated by geography, lacking low-cost means of transportation, the Central Africa Republic earns comparatively little from her exports, and pays heavily for her imports. It is considered imperative that the C.A.R. reorient her economy towards manufacture of goods for her own market. A survey was made of private investment opportunities in industry and commerce in the C.A.R. Five possible new industries - storage batteries, asbestos cement, starch, reconstituted mild and ice cream, and tomato puree - were selected on the basis of this survey and studied in detail. In each case, it was found that the industry can operate to serve C.A.R.'s internal market, to reduce present prices, and to earn a profit of at least 25% per annum. (Author)

PB-206 776/7 PC A08/MF A01
Central Treaty Organization, Ankara(Turkey).
CENTO Traveling Seminar on Farm Tools and Implements
Sep 66, 15[illegible]p TA/OST-AN-68-9-1

Keywords: *Hand tools, *Agricultural machinery, Surveys, Developing countries, Handbooks, Pakistan, Iran, Turkey.

A survey was carried out in Pakistan, Iran, and Turkey to help determine what could be done to provide farmers of these countries with better farm tools and more power to help them increase farm production. Major emphasis was laid on the collection of information on tools and implements in current use. In addition, consideration was given to a number of tools and attachments which it was felt should bo of wider use than at present. This report was prepared as a result of the survey. It is in the form of a handbook for use by agricultural technicians, extension workers, farmers, students, and producers of farm machinery as an aid in their work to promote practical, useable ideas which apply to their areas. (Author)

PB-206 798/1 PC A10/MF A01
General Electric Co., Schenectady, NY. General Engineering Lab.
Preliminary Report of Field Survey Teams on the Generation and Utilization of Power in Rural Areas of Developing Countries
Sep 62, 211p TA/OST-AN-62-9-1
Contract AID-REPAS-1
See also PB-206 800 and PB-206 801.

Keywords: Electrification, Rural areas, Developing countries, India, Colombia, Chile, Peru, Surveys, *Electric power, Utilization, Economic analysis.

The report presents the principal impressions and tentative conclusions of field investigations on the generation and utilization of electric power in rural areas which were conducted in India, Chile, Colombia, and Peru. The first part of the report provides a general review of existing rural electrification programs in India and Colombia. The remaining portions contain the observations of the field survey teams on the significance of small scale power units from the standpoint of village development programs.

PB-206 800/5 PC A06/MF A01
General Electric Co., Schenectady, NY. Advanced Technology Labs.
Small-Scale Power Supplies for Rural Communities in Developing Countries
Mar 63, 120p TA/OST-AN-63-3-1
Contract AID-REPAS-1
See also PB-206 798 and PB-206 801.

Keywords: *Electric power, Rural areas, Developing countries, Electric power plants, Electric generators, Economic analysis, Utilization.

The report describes and evaluates alternative small-scale technologies for supplying electric energy to rural communities in developing countries. It appraises the technical suitability of currently available small-scale power supplies, and delineates near-term and far-term development opportunities for improved equipment systems. The technologies considered include: Internal combustion engine generators; small scale hydroelectric plants; thermal vapor engine generators; gas turbine generators; wind generators, photovoltaic solar cells; thermoelectric generators; and fuel cells.

PB-206 801/3 PC A03/MF A01
General Electric Co., Schenectady, NY. Advanced Technology Labs.
Generation and Utilization of Power for Rural Communities in Developing Countries
Summary rept.
May 63, 39p TA/OST-AN-63-5-1
Contract AID-REPAS-1
See also PB-206 798 and PB-206 800.

Keywords: Electrification, Rural areas, Developing countries, *Electric power, Electric generators, Electric power plants, Utilization, Economic analysis.

The principal objective of the project was to assess the need for and significance of electric power for the development of rural communities, with particular attention to the utility and feasibility of small scale power supplies as a means of providing power to village communities. The specific areas of concern included: Small-and intermediate-scale generating plants and grid connections for rural communities; utilization of electric power in rural communities for irrigation, rural industry, and illumination; technical appraisal of potential small-scale power sources, refrigeration-cooling systems, and water treatment processes; and technical support for rural development. (Author)

PB-206 802/1 PC A04/MF A01
Forest Service, Washington, DC.
Report on Survey Team Projected AID Research Program on Improved Forest Products Utilization in Latin America
Alan D. Freas, B. Francis Kukachka, and Eugene F. Landt. Aug 65, 62p TA/OSTAN-65-8-1

Keywords: *Pulp, *Wood products, Utilization, *South America, Economic development, Research projects, Wood pulp, Surveys, Inventories, Quality, Tests, Peru, Brazil, Colombia, Venezuela, Ecuador.

South America has the largest single forested area in the world, most of it inaccessible and remote from population centers and, hence, unused to a great extent. Most of the forest consists of heterogeneous stands with many species that so far have not found their way into the world market or into local utilization. This report presents recommendations for a group of research projects to improve the economic use made of Amazonian and other forest areas of Peru, Brazil, Colombia, Venezuela, and Ecuador. The general nature of the projects are as follows: Research on little known timber species of Latin American in relation to their utilization locally and abroad; studies on the preparation of high yield pulps; and forest products utilization and marketing in Venezuela. (Author)

PB-206 804/7 PC A13/MF A01
Central Treaty Organization, Ankara, (Turkey).
CENTO Conference on Agricultural Extension, Held in Ankara-Denizli-Izmir, Turkey, 12-22 April 1967
Oct 67, 286p TA/OST-AN-67-10-1

Keywords: Education, Developing countries, Agriculture, Economic development, Meetings, Agricultural machinery, Marketing, Livestock, Fertilizers, Iran, Pakistan, Turkey, *Agricultural extension services.

Agricultural extension is an educational processes. It brings to agricultural communities the knowledge and skills developed by research institutions, and by making these known it seeks to improve the level of agricultural production. This report is comprised of papers presented at a symposium, held in Ankara, Denizli, and Izmir, Turkey, 12-22 April 1967, which was called to provide an opportunity for extension service officials to review practical approaches to successful extension work at the farmer level. (Author)

PB-206 805/4 PC A13/MF A01
Mississippi State Univ., State College. Seed Technology Lab.
Seed Processing and Handling
Charles E. Vaughan, Bill R. Gregg, and James C. DE Louche. Jan 68, 296p Handbook-1, TA/OST-AN-68-1-1
Contract AID/W-607

Keywords: *Seeds, Processing, Handling equipment, Developing countries, Handbooks, Seed processing.

Seeds are processed to remove contaminants, to size-grade for plantability, to remove damaged or deteriorated seed, and to apply seed treatment materials. This handbook was prepared as an introduction to seed processing and handling. Various types of equipment are considered. The main features and component parts, principles of separation, uses, and operational procedures are discussed for each machine. Emphasis is placed on the concept of the 'processing line', that is, the combination, proper sequence and arrangement of machines, conveyors, and procedures required for handling and processing seeds. (Author)

PB-206 806/2 PC A04/MF A01
International Rice Research Inst., Los Banos, Laguna, (Philippines).
Performance and Economics of Use of Small Equipment in Tropical Monsoon Countries: The Case of the Philippines
Stanley S. Johnson. Apr 68, 52p TA/OST-AN-68-4-1

Keywords: *Agricultural machinery, *Philippines, Economic development, Developing countries, Monsoons, Performance.

Mechanized agriculture is being introduced in the countries of Southeast Asia with varying degrees of success and acceptance. This paper discusses the status of mechanization in one of those countries, the Philippines. It provides the background in which this mechanization is proceeding, and then discusses the types of equipment that are being introduced. The performance data of these machines under Philippine conditions, and the economics of their use, are also presented. (Author)

PB-206 851/6 PC A05/MF A01
Organization for Social and Technical Innovation, Inc., Cambridge, Mass.
Industrialized Housing. The Opportunity and the Problems in Developing Areas, Ideas and Methods Exchange No. 66
Ian Donald Terner, and John F. C. Turner. Jan 72, 80p*
Sponsored in part by the Department of Housing and Urban Development, Washington, D.C.

Keywords: Residential buildings, Mass production, Developing countries, Reviews, Building, Industries, Automation, Construction, Prefabrication, Feasibility, Errors, Standards, Manufacturing, Expenses, Asia, Africa, South America, *Housing, Industrialized housing.

The problem of providing suitable shelter in the world's less developed nations is one of critical urgency. While this problem grows more and more acute, the industrialized nations of North America and Europe are struggling to meet their own housing needs through an increasingly advanced technology. It is a natural consequence of this process for housing manufacturers, technicians and public officials to seek possible applications of this advanced technology in less developed countries. In recent years, HUD's Office of International Affairs has increasingly been called upon to advise domestic housing producers and, through AID, foreign governments and developers on the appropriateness of industrialized techniques abroad. It has attempted to correct widely held misconceptions, while witnessing the costly failures of many attempts to develop criteria to assess the value of existing industrialized systems abroad, and at the same time to assist in the design of new systems created specifically for that market. (Author)

PB-206 902/9 PC A04/MF A01
Agency for International Development, Washington, DC.

Industrializing at the Grass Roots Level in the Philippines
Rept. for 1959-1963
Kenneth P. Sheldon. 1963, 63p TA/OST-AN-63-13-1

Keywords: Developing countries, Industries, Economic development, Developing countries, *Philippines, Economic development, Surveys, Natural resources, Agriculture, *Industrial development, Tarlac(Philippines).

The establishment of a first industry in an underdeveloped region stimulates others into being; a small beginning is enough to set up a chain reaction. This principle has been demonstrated time and again in the Philippines and in other developing countries. The document shows how this start was made in the highly agricultural provinces in the Philippines and the proper way for it to develop. In addition to a general discussion of principles and procedures, the document contains, for the purpose of providing a concrete example, a detailed report of a survey made of a single Philippine province (Tarlac) to obtain practical information concerning its resources, natural advantages, and the desires of its people regarding industrialization. (Author)

PB-206 904/5 PC A11/MF A01
Stanford Research Inst., Menlo Park, Calif.
An Industrial Park Development Program for Central America
Keith E. Duke, Phillip L. Adams, and Robert W. Davenport. Nov 64, 234p TA/OST-AN-64-11-2

Keywords: *Central America, Industries, *Industrial development, Developing countries, Feasibility, Project planning, Industrial plants, Parks, Roads, Site surveys, Plant location, Financial management, Industrial parks, Industrial development.

The development of a number of industrial parks in Central America could be an important means of stimulating industrial growth and promoting industrial development in this region. This document provides the results of a study undertaken to determine the desirability and feasibility of establishing such industrial parks, and to define the nature, scope, and costs of an industrial parks program. The topics covered include the purposes and characteristics of industrial parks in Central America, the physical infrastructure and its general influence on industrial growth and location of industrial parks in the region, specific proposed locations for industrial park sites, and financial and organizational resources for an industrial parks program. (Author)

PB-206 905/2 PC A02/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Economic Damage Caused by Aquatic Weeds. (Preliminary Survey)
Dec 71, 18p Rept no. TA/OST-71-5

Keywords: Economic analysis, *Aquatic weeds, Developing countries, Rivers, Streams, Navigable canals, Reservoirs, Lakes, Harbors, Classifying, Distribution(Property), Damage.

The report attempts to estimate in a very preliminary way the economic significance of the aquatic weed problem in developing countries. It is limited to the problems of weed infestation in rivers, streams, canals, reservoirs, ponds, lakes, harbors, and similar bodies of water. Topics covered are: types and distribution of aquatic weeds; types of damage; economic impact; and country specific situations. A bibliography is included. (Author)

PB-206 913/6 PC A04/MF A01
Colorado State Univ., Fort Collins.
Project Colorado. Feasibility Studies. Preliminary Designs
Harry F. Troxell, and Carlos E. De Sa. 1964, 61p TA/OST-AN-64-13-1
Prepared in cooperation with Bahia Univ., Salvador (Brazil).

Keywords: *Industrial development, Economic development, Developing countries, Industries, Brazil, Industrial mobilization, Feasibility, Food industry, Ceramics, Colorado project, Ceramics industry.

Project Colorado is a program of cooperation for industrial development in the State of Bahia, Brazil. The objectives, to develop new small, rural industries and to train business and engineering leaders, are accomplished by utilizing faculty and students from the University of Bahia and Colorado State University. The industrial development activities are based on a thorough analysis of the advantages and opportunities the region has to offer. Feasibility studies, followed by preliminary designs, were made for the following industries: Poultry and egg; ceramic products; peanut oil extraction; slaughterhouse for cattle and hogs; mandioca processing; and fruit processing. The document contains detailed reports of each of these industrial prospects by the personnel who contributed to the general evaluation, the marketing data, and the production requirements.

PB-206 967/2 PC A03/MF A01
Small Business Administration, Washington, DC.
Report on Small Industry Programs in Turkey
Ross D. Davis. 15 Feb 65, 41p TA/OST-AN-65-2-2

Keywords: *Industrial development, *Small businesses, *Turkey, Industries, Economic development, Developing countries, Planning, International trade, Evaluation, Small industry.

The report sets out observations based on a visit to Turkey made in January 1965 by the Executive Administrator of the U. S. Small Business Administration. The purpose of the visit was to evaluate certain plans of the Government of Turkey designed to modernize small-scale industry, to promote its integration into a balanced pattern of industrial development, and to create in small industry a significant capacity for import substitution and export activities. The topics covered in the report include: Role of small industry in Turkey; planning for small industry; current activities to support small industry; some useful principles to guide the development and operation of small industry programs; comments on the small industry programs in Turkey; an agency for small industry programs. (Author)

PB-206 969/8 PC A13/MF A01
Michigan Univ., Ann Arbor. Architectural Research Lab.
Architectural Research on Structural Potential of Foam Plastics for Housing in Underdeveloped Areas
Research rept. 1962-1965
Stephen C. A. Paraskevopoulos, Harold J. Borkin, J. Sterling Crandall, James L. Haecker, and Willard A. Oberdick. Nov 65, 295p TA/OST AN-65-11-2

Keywords: *Foam plastics, *Building materials, Houses, Cellular plastics, Developing countries, Houses, Structural plastics, Structural engineering, Marketing, Plastics industry, Structural forms, Structural analysis, Construction, Laminated plastics.

A feasibility study, reported in PB-206 799, established the desirability of investigating the use of foam plastics as structural materials, in the belief that such a development could contribute towards a resolution of housing problems throughout the world. This report describes a research program aimed at exploring the structural potential of these materials for housing in underdeveloped areas. A review is provided of plastics from the standpoint of physical properties, raw materials resources, production, and marketing. A detailed description is given of a structural investigation of foam plastics, and a number of demonstration structures are analytically described. (Author)

PB-206 970/6 PC A04/MF A01
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
Prefeasibility Study of an Expanded Leather and Shoe Industry in West Africa to 1980
Research rept.
Konrad Biedermann. 29 Jul 66, 57p TA/OST-AN-66-7-1

Keywords: *Footwear, Economic development, Developing countries, Industries, *Africa, *Leather, Shoes, Industrial mobilizing, Leather industry, Shoe industry.

Cooperative economic-development planning on a basis that includes the entire West African sub-region promises to result in an industrial development pattern that might contribute to a more effective and economic utilization of African resources and to improvement in living standards. This requires, however, obtaining an overview of what a feasible industrialization pattern for specific industries within the sub-region might be over a period of 10 to 15 years. An attempt is made, in the report, to answer some of the basic questions along these lines for the leather and shoe industry in West Africa. Consideration is given to West African markets for leather and shoes, current production capabilities, feasiblo expansion of leather and shoe production to 1980, and the potential importance to economic development of West Africa.

PB-206 971/4 PC A03/MF A01
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
Prefeasibility Study of an Expanded Paint Products Industry in West Africa to 1980
Research rept.
Harry W. Barr, Jr. 29 Jul 66, 41p TA/OST-AN-66-7-2

Keywords: Economic development, Developing countries, Industries, *Africa, *Paints, Industrial mobilizing, Paint industry.

A study was undertaken to gain an approximation of what a feasible industrialization pattern for the paint products industry in the West African sub-region would appear to be in the period up to 1980. The report provides the results of the study. Consideration is given to current markets for paint products, projected markets to 1980, Local production of raw materials and paint products, and potential importance to the economic development of West Africa.

PB-206 972/2 PC E01/MF A01
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.
Pre-Investment Study. Meat Packing Industry for Entente Guaranty Fund
Nov 67, 177 TA/OST-AN-67-11-1
Contract AID/afr-496

Keywords: *Food products, Food industry, Meats, *Africa, Livestock, Economic analysis, Economic development, Market research, Developing countries, Investments, United States, Meat packing industry.

Livestock are among the principal resources of the West African Savanna zone, and surplus livestock have, for centuries, supplied some of the consumption needs of the populous Coastal cities many hundreds of miles to the south. It is believed that this traditional livestock trade can be rationalized principally by more slaughterhouses in the producing zone, and subsequent shipment of meat to the consuming areas. This procedure would tend to add more value to the products of the stock raising countries, while providing better and cheaper meat to consumers. Accordingly, an economic and technical analysis was undertaken aimed at inducing U. S. private investment in the livestock industry in Niger and Upper Volta to serve markets in Ivory Coast, Togo, Dahomey, Ghana, Nigeria, and other appropriate markets. Consideration was given to availability of livestock in Niger and Upper Volta, and type of existing potential consumer markets.

PB-206 976/3 PC E01/MF A01
Michigan Univ., Ann Arbor. Architectural Research Lab.
Factors Governing the Introduction of Foam Plastics for Housing Use in Underdeveloped Areas of the World
Stephen C. A. Paraskevopoulos, Harold J. Borkin, J. Sterling Crandall, C. Theodore Larson, and Willard A. Oberdick. Jun 66, 65 TA/OST AN-66-6-1

Keywords: *Foam plastics, *Building materials, Houses, Cellular plastics, Developing countries, Laminated plastics, Structural plastics, Structural engineering, Structural design, Construction, Roofs, Sheathing, Buildings.

The technical and economic feasibility of using foam plastics in housing in underdeveloped areas of the world has been established, as described in previous reports in this series. This document represents a follow-up intended to advise AID specifically on the introduction of foam plastics for housing use abroad and to report on progress of an on-going testing program. Paper-laminated foam board gives every indication that it is a building material suitable for many different applications, and possible uses of this material in inexpensive roofing systems are described and illustrated. (Author)

PB-206 977/1 PC A06/MF A01
Auburn Univ., Ala. International Center for Aquacultures.
Fishculture Survey Report For West Central Africa. Increasing Fish Production by Improved Fishcultures
D. D. Moss, G. B. Pardue, and M. J. Danner. 30 Jun 69, 125p TA/OST-AN-69-6-3

Keywords: Aquaculture, Surveys, Economic development, *Africa, *Fisheries, Developing countries, Marketing, Research projects, Food processing, Drying, Shrimps, Shellfish, Fresh water fishes, Marine fishes, Cameroon, Central African Republic, Ghana, Ivory Coast, Nigeria, Senegal, Togo.

Intensive fishculture is an effective means of producing protein of high quality. In view of this, a survey was made of the status and needs of fishculture activities in the following West Central African nations: Cameroon, Central African Republic, Ghana, Ivory Coast, Nigeria, Senegal, and Togo. Attention was given to existing programs being carried out in inland fisheries, with emphasis on fishculture projects, and to the marketing and economics of the fisheries in each country. (Author)

PB-207 132/2 PC A03/MF A01
Maynard (H. B.) and Co., Inc., Pittsburgh, Pa.
Feasibility of Ipecac Extraction Plant
Final rept.
Eugene H. Payne. Apr 66, 45p TA/OST-AN-66-4-1
Contract AID/csd-239, PIO/T-511-049-3-20346

Keywords: *Medicinal plants, Drug industry, *Industrial plants, Developing countries, *Drugs, *Plants(Botany), Alkaloids, Extraction, Economic development, Cephaelis ipecacuanha, *Ipecac, *Bolivia.

'Brazilian' ipecac is the rhizome and root portions of the low growing vine Cephaelis (Uragoga) ipecacuanha. It is the source of emetine and several other alkaloids. The report presents the results of a study undertaken to determine the feasibility of establishing facilities to distill ipecac in Bolivia. It was found that such a facility would be economically sound only under one or both of two conditions: (1) that the cultivation of the source plant be encouraged; and (2) that it be operated in conjunction with the extraction of other products, such as cocillana, achiote, and cinchona.

PB-207 192/6 PC A04/MF A01
Geological Survey, Reston, VA.
Techniques for Assessing Water Resources Potentials in the Developing Countries, with Emphasis on Streamflow, Erosion and Sediment Transport, Water Movement in Unsaturated Soils, Ground Water, and Remote Sensing in Hydrologic Applications
Preliminary rept.
George C. Taylor, Jr. Dec 71, 73p
Grant PASA-TA(IC)-9-72

Keywords: *Water resources, Developing countries, *Hydrology, Research, Stream flow, Soil erosion, Sediment transport, Ground water, Remote sensing, Probes, Soil water.

The preliminary report describes techniques for assessing water-resource potentials in the developing countries, most of which lie in the tropics. Techniques or methodology for measuring or evaluating hydrologic parameters are described in the categories of streamflow, erosion and sedimentation, water movement in unsaturated soils, ground water and remote sensing in hydrologic applications. Selected bibliographies of each of these categories are included. (Author)

PB-207 385/6 PC A07/MF A01
Inter-American Geodetic Survey, Fort Clayton. Canal Zone. Natural Resources Div.
Natural Resources-Cadastral Inventory. Nicaraguan Pilot Project
Report for 1965-1966.
Mar 66, 126p TA/OST-AN-66-3-I

Keywords: Land surveys, *Nicaragua, Developing Countries, *Natural resources, Geology, Geomorphology, Climatology, * Hydrology, Soils, *Land use, Land titles, Cadastral surveys.

In preparation for a comprehensive cadastral and natural resources survey of Nicaragua, a pilot survey was undertaken in an agricultural area in the vicinity of Leon. The primary purpose was to provide orientation for those Nicaraguan specialists expected to occupy leading roles in the planning and execution of the comprehensive survey. This report presents a description of the geology, geomorphology, climatology, hydrology, soils, land use, and cadastral aspects of the region as determined by the survey. (Author)

PB-207 399/7 PC A17/MF A01
Soil and Pavement Consultants of Southeast Asia, Oakland, Calif.
Engineering Study of Laterite and Lateritic Soils in Connection with Construction of Roads, Highways, and Airfields. Phase I. Southeast Asia (Thailand)
Final rept.
B. A. Vallerga, J. A. Shuster, A. L. Love, and C. J. Van Til. Jun 69, 382p TA/OST-AN-69-6-4
Contract AID/csd-1810

Keywords: *Laterites, *Soils, Soil properties, *Southeast Asia, *Roads, Construction, Landing fields, Classifications, *Soil stabilization, Flexible pavements, Performance, Geomorphology, Structural design, Specifications, Durability, Foundations, *Thailand, Lateritic soils.

There are a number of soils, principally those referred to as laterites and lateritic soils, which are found in southeast Asia and other tropical environments, but are essentially unknown in countries of the temperate zones. This document provides the results of field studies carried out in Thailand on lateritic soils. Included are reports on background studies of the literature and of geology, the development of a classification system for the soils pavement evaluation studies, and special studies on durability, stabilization, and dynamic properties. (Author)

PB-207 400/3 PC A04/MF A01
National Science Foundation, New Delhi (India). Science Liaison Staff.
Science Education Improvement Project
1970, 71p TA/OST-AN-70-13-1

Keywords: *Education, *India, Developing countries, Programmed instruction, Developing countries, Research, Schools, Project planning, Improvement, Classifications, Science education, Curriculum development.

The report covers the activities of the Indian Science Improvement Project during the calendar year 1970. The major emphasis is on curriculum development activities. Topics covered include elementary and secondary school science programs, travelling science workshop, college science improvement program, special college/university programs, technical education, binational conferences, teaching aids, and participant training.

PB-207 491/2 PC A17/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Village Technology Handbook
May 70, 382p TA/OST-AN-70-5-1

Keywords: Community development, Rural areas, Developing countries, Handbooks, Economic development, Crafts, Water resources, Sanitary engineering, *Irrigation, *Roads, Construction materials, Food, Snails, Washing, Heating, *Housing, *Food storage, *Solar water heating, *Technical assistance, *Sewage disposal, *Water supply, *Handicrafts, Village technology.

Village development takes on special importance in the light of the fact that 80% of those who live in less developed countries live in villages. This handbook is aimed at helping villagers to master the resources available to them. The general topics covered include water transport; storage, and purification, latrines, bilharziasis control, irrigation and road-building, poultry raising, silage, storing food at home, storing vegetables and fruit for winter use, how to salt fish, concrete construction, bamboo construction, glues, solar water heater, washing machines, cookers and stoves, home soap making, and bedding.

PB-207 495/3 PC A17/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science, Technology, and Development. Volume I. Natural Resources. Energy, Water, River Basin Development
1962, 381p TA/OST-AN-62-13-1
See also Volume 3, PB-207 498.

Keywords: *Water resources, Economic development, Developing countries, *Natural resources, Electric power, Cooperation, Rural areas, Coal mining, Fuels, Crude oil, Refineries, Water supply, *River basin development, *Energy, Reviews, Meetings.

The document is volume one of a twelve volume series containing papers of U.S. origin which were submitted at a conference on the Application of Science and Technology for the Benefit of Less Developed Areas, held in Geneva in 1963. It includes the following papers: Electrical distribution grid design and construction for rural areas, The REA program and the role of rural electric cooperative, TVA's experience with a power utilization program for rural areas, Some problems in initiating power supply in less developed areas, Rural electrification and rural development, Typical problems in the development of modern power supply in less developed areas, Practical application of coal mining technology, Metallurgical, domestic, and industrial utilization of low-rank coals; Auxiliary injected blast furnace fuels, Financing oil expansion, Economics and design of smaller petroleum refineries.

PB-207 496/1 PC A12/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science, Technology, and Development. Volume III. Agriculture
1962, 273p TA-OST-62-13-3
See also Volume 4, PB-207 497.

Keywords: Economic development, Developing countries, *Agriculture, Reviews, Labor relations, Farms, Management planning, Food habits, Nutrition, Meetings, Dietetics, Fisheries, Irrigation, Soil science, Plant genetics, Plant diseases, Pest control.

The document on agriculture is Volume 3 of a twelve volume series on science and technology in developing countries. It includes the following papers: Organizing for Agricultural Development; Tenure of farms; Motivation, productivity, and efficient use of labor, land and capital; Agricultural - Industrial Development, Effective Communication, Improving management in agricultural development, Meeting human needs through agricultural and food practices, Changing dietary and health practices, International cooperation in nutrition, research and planning; The evolution of soil science, Irrigation as a modern science, Plant genetics in increasing food production, Understanding and Control of Plant Diseases, and Protection from Insect and Vertebrate Pests.

PB-207 497/9 PC A09/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science, Technology, and Development. Volume IV. Industrial Development
1962, 193p TA/OST-AN-62-13-4
See also Volume 5, PB-207 498.

Keywords: *Industrial development, Economic development, Developing countries, Industries, Developing Countries, Reviews, Policies, Financing, Marketing, Research, Iron and steel industry, Food processing, Wood products, Computer programming, Sociometrics, River basin development, Technology.

Volume 4 of a twelve volume series on science and technology in developing countries includes the following papers: Policy considerations in expanding industrial development, Creating a practical industrial development program, Adequate capital for industrialization; Planning Management in Industrializing Countries, Small and medium industry in development, Markets as a basis for industrial development; Integrated river-basin development and industrialization; The research institute as a key industrial development instrument, the Computer and High-Speed Information Processing industrial development; The iron and steel industry in a developing economy, Food processing and the developing society, and the forest products industry in economic development.

PB-207 500/0 PC A05/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science, Technology, and Development. Volume VII. Social Problems of Development and Urbanization
1962, 99p TA/OST-AN-62-13-7
See also Volume 8, PB-207 501.

Keywords: Urbanization, Economic development, Developing countries, *Social change, Culture(Social sciences), Sociometrics, Rural areas, Municipalities, Regional planning, Political systems, Community development, Residential buildings, Facilities, Reviews, Technology.

Volume 7 of a twelve volume series on science and technology in developing countries includes the following papers: Patterns of worldwide cultural change in the 1960's, Social stratification and social mobility in the development process, A theory of community development, The role of the family in industrialization, Adjusting rural people to an urban environment, Implications of urbanization for villages and rural sectors, Planning and development in metropolitan areas, Housing and community facilities in human development, Capital requirements for urban social overhead, and The political implications of urbanization and the development process.

PB-207 507/5 PC A17/MF A01
Basin Electric Power Cooperative, Bismarck, N. Dak.
Rural Housing Manual
William A. Schott. Mar 71, 378p*
Sponsored in part by the Department of Housing and Urban Development, Washington, D.C.

Keywords: *Housing, Residential buildings, Rural areas, Regional planning, Manuals, Community development, Surveys, Project planning, Financing, Cooperation, Legislation, Land use, Classifications, Management planning, Housing cooperatives.

The key to success in a housing program lies in the ability and desire of the local rural leadership to attain good low-cost housing. To accomplish this goal, personnel must be adequately informed and trained. It is intended that this training manual, along with technical assistance will provide rural electric cooperatives with the information they need.

PB-207 520/8 PC A18/MF A01
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.
Opportunities for Cost Reduction in the Design of Transport Facilities for Developing Regions
1970, 403p TA/OST AN-70-12-2
Contract DOT-OS-A9-004

Keywords: *Transportation, Developing countries, Cost engineering, *Roads, Design standards, Cost analysis, Construction, Savings, *Air transportation, *Waterway transportation, Ground vehicles, Economic models.

The document provides the results of an examination of traditional designs of transport facilities in the developing countries with a view to reducing total initial and/or operating costs, or to reducing costs devoted to the imported elements. The topics include: road cost analysis and design standards; road construction cost model; a road maintenance cost model; opportunities for cost savings in highway engineering design; economics of one-way bridging; potential cost savings in the design of water crossings; potential cost savings in the design and use of ground vehicles; opportunities for cost reductions in aircraft, airways, and airports; potential cost-savings in the selection of waterway and harbor techniques; harbors and associated facilities; economic models for choice of transport techniques in developing countires; tradeoffs between construction costs and maintenance costs.

PB-207 534/9 PC A04/MF A01
Council for International Progress in Management (USA), Inc., New York.
Report of Management Training Specialists Team, Brazil
Rept. for 31 Aug-12 Dec 64
Robert C. Dietrick, Louis C. McAnly, and James W. Quigg. Dec 64, 57p TA/OST-AN-64-12-2
Contract PIO/T-512-40297

Keywords: Industrial management, *Management training, *Brazil, Economic development, Developing countries, Project planning, Organization theory.

The document summarizes the activities of a management training team which was assigned the responsibility of working with trainers of managers in 15 Productivity Centers in Brazil, of demonstrating improved techniques at the local plant level, of giving consultation and advice to productivity institutions on organization and activities programs, and of giving assistance to other management development institutions in Brazil. The program at each Center consisted of round-table discussions, plant visits, case study solutions, and the use of all other modern techniques to develop a local nucleus of management experts for the expansion and multiplication of Brazilian institutional self-help efforts.

PB-207 613/1 PC A06/MF A01
Corps of Engineers, Washington, DC.
Report on Potential Growth of Aquatic Plants of the Lower Mekong River Basin, Laos-Thailand
Mark L. Nelson, Edward O. Gangstad, and Donald E. Seaman. Feb 70, 125p TA/OST-AN-70-2-1

Keywords: *Aquatic plant control, Aquatic weeds, River basins, River basin development, Developing countries, Multiple purpose reservoirs, *Weed control, Irrigation canals, Plant growth, *Laos, *Thailand, Pa Mong project, Mekong River.

The Pa Mong project is a hydroelectric power and irrigation system on the Mekong River, in Laos and Thailand. Concern has been expressed as to what extent aquatic vegetation, such as water hyacinth, will interfere with the operation and maintenance of the project. This document is the report of a team that was assembled to assess problems, evaluate present methods of dealing with these problems, and make design and research recommendations relevant to multi-purpose water resource projects in the Lower Mekong Basin. Included in the report are a section on growth potentials describing a number of local factors bearing on the aquatic weed problem. (Author)

PB-207 618/0 PC A04/MF A01
Lyon Associates, Inc., Baltimore, Md.
Usage Manual for Sampling and Testing Laterite and Lateritic Soils and Other Problem Soils of Africa
1971, 72p TA/OST AN-71-6-2
Contract AID/csd-2164
Prepared in cooperation with Building and Research Institute, Kumasi, Ghana.

Keywords: Soil tests, *Africa, *Roads, Developing countries, Identifying, Sampling, *Laterites, Manuals, *Soils, Lateritic soils.

Soil testing is an important and integral part of highway design and construction. This manual has as its purpose the provision of basic details on: identifying the various soils; the laboratory equipment required to perform the tests; exploration and sampling techniques for soils; and laboratory test procedures. The format is straightforward and simple with many illustrations provided. It is expected that even inexperienced engineers and technicians will find the manual relatively easy to use in the field. (Author)

PB-207 619/8 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Planning Sites and Services Programs. Ideas and Methods Exchange No. 68
Alfred P. Van Huyck. Jul 71, 75p TA/OST-AN-71-7-1

Keywords: *Housing, *Site selection, Residential buildings, Site surveys, Project planning, Developing countries, Urbanization, Policies, Neighborhoods, Foreign countries, Socioeconomic status Low income families, Lessons learned, Dwelling services projects.

Housing sites and services projects are not a new idea, but the adoption of the concept on a massive scale is only just now gaining credibility as the most feasible method for dealing with the vast numbers of low-income people seeking land and shelter in the developing world. This document analyzes reasons that sites and services projects should be a major part of the urbanization program of the developing countries. It also discusses the lessons to be learned from previous worldwide experience with the sites and services concept. A method is proposed for planning the sites and services project, and suggestions are given as to how the individual project should be viewed in the context of a national program.

PB-207 625/3 PC A07/MF A01
Utah State Univ., Logan. Office of International Programs.
Rural Industrial Technical Assistance (RITA)
Lawrence C. Taylor, Dalton Andrade, Robert Collier, and George Seely. Jul 71, 129p TA/OST AN-71-7-2
Contract AID/la-291
Prepared in cooperation with the Federal University of Rio Grande do Norte (Brazil).

Keywords: Industries, Developing countries, Economic development, Training, Selection, Project planning, Cost analysis, Brazil, *Industrial development, *Technical assistance, RITA project.

Project RITA (Rural Industrial Technical Assistance), Rio Grande Do Norte, was a program designed to provide assistance in industrial development to selected areas in the interior of the State of Rio Grande Do Norte. The project team consisted of professors and graduate students from the Federal University of Rio Grande Do Norte and from Utah State University. Their efforts involving the study, selection, planning, organization, and establishment of small and medium sized businesses in the project area are reported in this document. (Author)

PB-207 628/9 PC A06/MF A01
Education Development Center, Newton, Mass.
Beginning Science Curriculum for English Speaking Tropical Africa (African Primary Science Program)
Final rept., 1960-71.
1 Dec 71, 125p TA/OST-AN-71-12-1
Contract AID/csd-772

Keywords: *Education, Developing countries, *Africa, Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania, Uganda, Science education, Curricula.

The African Primary Science Program, which was established in 1960 as part of the African Education Program, has operated widely in English-speaking African countries. Science centers have been established with program assistance in seven of these: Ghana, Kenya, Malawi, Nigeria, Sierra Leone, Tanzania, Uganda. Its goals have been centered on changes in Pedagogy, but it has also sought to influence the role of education in developing countries. The report records and documents the Program's development, its changing structure, and its efforts to respond to the needs of the countries involved and developing African initiative.

PB-207 636/2 PC A14/MF A01
Lyon Associates, Inc., Baltimore, Md.
Laterite and Lateritic Soils and Other Problems Soils of Africa. Development of Engineering Standards and Criteria for the Usage of Laterite, Lateritic Soils, and Other Problems Soils in Connection with the Constructio n of Roads, Highways and Airfields
Jun 71, 308p TA/OST AN-71-6-1
Contract AID/csd-2164

Keywords: Soil properties, *Africa, *Roads, Developing countries, *Laterites, Clay soils, Soil stabilization, Tropical regions, Ghana, *Soils, Lateritic soils.

Roadway design practices in the tropics have evolved, by and large, from American and European experience. The adequacy of these procedures, which were devised through experience with temperate zone soils, have never really been evaluated for the climatic conditions, the soils, and the traffic patterns of tropical Africa. It was therefore decided that lateritic materials, so plentiful in tropical areas, should bo studied in a thorough research program. This document represents the results of such a study carried out in tropical Africa, with emphasis on Ghana. A review of the pertinent literature is provided for both lateritic soils and tropical black clays, and the engineering properties of both types are described. (Author)

PB-207 647/9 PC A10/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Agricultural Equipment Development Research for Tropical Rice Cultivation
Semiannual progress repts. nos. 10, 11, 12, 13, 1 Jan 70-31 Dec 71
Amir U. Khan, Fred E. Nichols, and J. Bart Duff. 31 Dec 71, 207p TA/OST-AN-71-12-2
Contract AID/csd-2541

Keywords: *Agricultural machinery, Developing countries, *Rice, Cultivation, Tropical regions, Rice cultivation.

The document deals with efforts toward the design, development, and extension to commercial manufacturers of power-driven equipment suitable for use in the production and processing of rice under tropical conditions. Emphasis has been placed on the development of equipment for use by farmers in the 2 - to 10 - hectare size category, and which can be fabricated within the countries of the region employing locally available resources and manpower to the maximum extent possible. (Author)

PB-207 612/9 PC A03/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Wood in the Construction of Mass-Produced Houses
Geza Ifju, and E. George Stern. Aug 71, 28p

Keywords: *Houses, *Wooden structures, *Building materials, Structural members, Structural timber, Residential buildings, Mass production, Mechanical properties, Strength weight ratio, Life(Durability), Cost engineering, Foundations, Structural design, Low cost housing.

The properties and characteristics of wood, that are important in its engineered use in building and construction and, especially, in the mass-production of low-cost houses, are presented in an up-to-date approach by means of specific examples in a two-part presentation: Part I deals with the properties of wood which make it especially suitable for construction. The principal topics covered are strength-weight relationships and durability. Part II covers recent developments in the use of wood in the prefabrication and mass production of low-cost houses with particular reference to their foundations.

PB-207 862/4 MF A01
Department of Transportation, Washington, DC.
Preparation and Appraisal of Transport Projects
Rept. for 1964-65
Jun 68, 107p TA-OST-AN-68-6-1
Paper copy available from GPO as Stock No. TD1.2:T68/6.

Keywords: Developing countries, *Transportation management, Project planning, Evaluation, Handbooks, Concepts, Methodology, Economic analysis, Engineering standards, Traffic, Systems analysis, Benefit cost analysis, Decision making.

The report is drawn largely from existingeconomic and engineering knowledge to provide a guide for making transport investment decisions in the less developed countries. Specific topics include specifying transport problems and identifying alternative courses of action, design of a transport study, analysis of present and potential traffic, capacity of an existing transport system, estimating benefits from transport investments, appraisal of costs and determination of alternative technical solutions, and decision criteria for choosing among alternative investment possibilities.

PB-207 980/4 PC A02/MF A01
Road Research Lab., Crowthorne (England).
A Review of Rural Traffic-Counting Methods in Developing Countries
J. D. G. F. Howe. 1972, 25p Rept no. RRL-LR427

Keywords: *Traffic engineering, Traffic surveys, Developing countries, Vehicular traffic, Rural areas, Counting, Data acquisition, Reviews, Questionnaires, Methodology, Automation, Recommendations, Traffic counting methods.

The report reviews methods of rural traffic counting currently used in developing countries and examines the accuracy of the resulting flow estimates. The results of a questionnaire surveys among a sample of developing countries suggest that decisions on the duration, frequency, and timing of counts are at present arbitrary. It is suggested that for increase in the accuracy of rural traffic estimates automatic traffic counters be used on a wider scale than at present.

PB-208 432/5 PC A16/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science, Technology, and Development. Volume II. Natural Resources. Minerals and Mining, Mapping and Geodetic Control
1962, 362p TA/OST-AN-62-13-2
See also Volume 1, PB-207 495 and Volume 3, PB-207 496.

Keywords: *Mineral products, Natural resources, Developing countries, Mineral deposits, Economic development, Geological surveys, Government policies, Organizations, Project planning, Mining engineering, Regional planning, Pakistan, Chile, Mexico, Processing, Mapping.

The volume includes the following papers: Government as a dynamic agent in mineral resource development, The role of national geological surveys in mineral resources development, The importance of a central mines bureau in fostering development of mineral resources, Legislative choices in the development of mineral resources, Development organization and operation of the Institute in Chile, Opportunities for regional organization in mineral resources development, A cooperative program in Pakistan, In-service and university training of geologists and mineral engineers, Nonmetallic mineral resources for fertilizers, Regional heavy-mineral reconnaissance for ore deposits in deeply weathered areas with semi-humid to humid and temperate to tropic climate.

PB-208 527/2 PC A10/MF A01
Department of the Interior, Washington, DC. Office of Library Services.
Control of Aquatic Vegetation in Freshwater
Bibliographic series
Patricia A. Skaptason. Mar 72, 219p Rept no. INT-BIB-72-28

Keywords: *Aquatic plant control, Aquatic weeds, Control, Fresh water, Bibliographies, *Weed control, Herbicides, Aquatic plants.

Bibliography of 851 English language publications dealing with the control of aquatic vegetation in freshwater. Chemical, biological, mechanical, and ecological methods of control are included. Strictly toxicological works were excluded. Covers literature published from 1966 through early 1971. A special feature is provided by the Aquatic Plants Index and the Herbicide Index at the back of the volume. (Author)

PB-208 550/4 PC A04/MF A01
National Academy of Sciences, Washington, DC.
Solar Energy in Developing Countries: Perspectives and Prospects
Mar 72, 60p* TA/OST-NAS-72-34
Contract AID/csd-2584

Keywords: *Solar energy, Developing countries, Solar power generation, Utilization, Evaporation, Heating, Drying, Distillation, Air conditioning, Refrigerating, Direct energy conversion.

This is a report of an ad hoc Advisory Panel, made up of specialists from the United States and abroad, to: (1) Assess the state of the art in utilizing solar energy for developing countries and review current practical applications; (2) identify promising areas for research and development; and (3) examine the desirability of establishing an international solar energy institute in North Africa, to carry out solar energy research and development.

PB-209 172/6 PC A02/MF A01
Water Resources Council, Washington, DC.
Summary: Federal Agency Technical Comments on the Special Task Force Report Entitled 'Procedures for Evaluation of Water and Related Land Resource Projects'
Final rept.
Jul 70, 17p Rept no. US-WRC-0088

Keywords: *Water resources, Management planning, Project planning, Economic development, Regional planning, Social welfare, Cost analysis, Accounting, Research management, Reviews.

The report contains a condensation of and blending without evaluation of the technical comments by the various agencies. (Author)

PB-209 175/9 PC A03/MF A01
Water Resources Council, Washington, DC.
Principles for Planning Water and Land Resources
Final rept.
Jul 70, 31p Rept no. US-WRC-0091

Keywords: *Water resources, Management planning, Natural resources, Management planning, Economic development, Regional planning, Social welfare, Benefit cost analysis, Standards, Cost estimates.

The report discusses principles to provide a broad policy framework for planning activities and including the conceptual or theoretical basis for planning. (Author)

PB-209 176/7 PC A13/MF A01
Water Resources Council, Washington, DC.
Standards for Planning Water and Land Resources
Final rept.
Jul 70, 296p Rept no. US-WRC-0092

Keywords: *Water resources, Management planning, Standards, Benefit cost analysis, Cost comparison, Economic development, Water supply, Flood control, Social welfare.

The document is a report on Standards to provide uniformity and consistence by comparing, measuring and judging benefits, costs, and alternatives. (Author)

PB-209 177/5 PC A10/MF A01
Water Resources Council, Washington, DC.
A Summary Analysis of Nineteen Tests of Proposed Evaluation Procedures on Selected Water and Land Resource Projects
Final rept.
Jul 70, 212p Rept no. US-WRC-0093

Keywords: *Water resources, Management planning, Abstracts, Tests, Regional planning, Standards, Project planning, Economic development, Cost analysis.

The tests pointed up many areas in the report of June 1969, where ambiguities existed and further clarification was required. Test results substantiated that the June report was concerned primarily with concepts and included only a few standards and procedures to implement them. Tests have indicated that the multiobjective approach to planning is practical. (Author)

PB-209 042/2 PC A07/MF A01
National Water Commission, Arlington, Va.
Desalting
Final rept. 1969-1971
Victor A. Koelzer. May 72, 133p* Rept no. NWC-EES-72-045

Keywords: *Desalination, Desalting, Reviews, *Water supply, History, Distillation, Freezing, Osmosis, Ion exchanging, Electrodialysis, Economic analysis, Cost estimates, Capital costs, Operating costs, Electric power demand, Waste disposal, Brines, Marketing, Water costs.

Based on a comprehensive review of desalting literature and interviews with experts in the field, the report evaluates the state of the art of desalting technology. It summarizes program on desalting technology, and describes applicability of distillation, crystallization, membrane and chemical processes. In an attempt to evaluate the markets for desalted water, the report looks at water costs, economies of scale and other marketing factors. Applications of desalting technology are considered for incremental supply, to improve quality of supply, for intermittent operations, in dual-purpose plants, to renovate water for reuse, and for agriculture. The report concludes that desalting is presently a technically feasible source of new water for situations of specialized need, and makes research recommendations. (Author)

PB-210 104/6 PC A04/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Science and Technology for International Development: A Selected List of Information Sources in the United States
Mar 72, 56p* Rept no. TA/OST-72-7

Keywords: Information centers, Economic development, Developing countries, Bibliographies, Libraries, *Information sources.

The report presents a list of libraries and other organizations which have relatively complete and comprehensive holdings of publications pertaining to science and technology in developing countries. For each of these organizations, information is provided concerning the nature and strength of the collection, publications issue, information services provided, and the individual to contact for further assistance. A listing of reports produced by, for, or with the assistance of AID and which are available from NTIS is given. Also included is a list of reports on science and technology for international development issued by various other international and regional organizations. (Author)

PB-210 105/3 PC A08/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
The Role of the Agency for International Development in the Field of Natural Resources Planning and Management
Apr 72, 153p Rept no. TA/OST-72-8

Keywords: *Natural resources, Management, Developing countries, Economic development, Meetings, Natural resource management.

The report is one of the results of a Workshop on Natural Resource Planning and Management which was held on 21 January 1972 at Washington, D. C. It describes the key issues, significant observations, and major findings and conclusions which emerged from that session, as well as from documentation presented by U. S. technical agencies and multilateral institutions both in advance of and subsequent to the workshop. Some of the subjects covered include: Significance of natural resources to economic growth; constraints on natural resources development; current role of governments, development assistance agencies, and private industry; special capabilities of the United States for international assistance; activities and perspectives of U. S. technical agencies and international development institutions. (Author)

PB-210 107/9 PC A05/MF A01
National Academy of Sciences, Washington, DC.
Scientific and Technical Information for Developing Countries
Apr 72, 92p* TA/OST-AN-72-4-1
Contract AID-csd-2584
A report of an Ad Hoc Advisory Panel of the Board on Science and Technology for International Development of the National Academy of Sciences.

Keywords: *Information services, Information, Developing countries, Research, Information retrieval, Information systems, Transfer of technology, Information resources, Technical assistance.

Scientific and technical information is an essential element in the economic development process. A rationale is needed to guide the formulation of assistance programs addressed to the problem of information resources in less developed countries. This report is intended as a first step toward meeting this need. The first portion elaborates the need for more effective use of scientific and technical information in development efforts, and then outlines a rationale for increased technical assistance in this area. A review is provided of the functions of the information transfer process and the necessary components of the information infrastructure. Consideration is given to specific information requirements of the developing countries in the areas of industrial technology, natural resources, and the scientific and technical disciplines. Finally, a series of recommendations are presented encompassing policy, priorities, programming, administration, and suggested action programs for technical assistance in scientific and technical information. (Author)

PB-210 128/5 PC A21/MF A01
Cornell Univ., Ithaca. Center for Housing and Environmental Studies.
Research Methods for Housing and Urbanization Studies in Developing Countries
Margaret E. Woods, and Earl W. Morris. 30 Jun 69, 479p TA/OST-AN-69-6-5
Contract AID/csd-817

Keywords: Residential buildings, *Puerto Rico, Urban development, Latin America, Demographic surveys, Developing countries, Research, Sociometrics, Economic factors, Political systems, Family relations, Socioeconomic status, Improvement, Project planning, *Housing, San Juan(Puerto Rico).

A pilot study of urban housing was undertaken in San Juan, Puerto Rico, to design and test methodological tools for the conduct of housing research in the urban areas of Latin America. Social, economic, demographic, and political aspects of urban housing were studied, and the document is based on the findings of that study. The first portion provides a broad survey of methods of survey research and their applicability to the conduct of sample surveys in the urban areas of developing nations. Next, methodology and techniques are presented for measuring housing characteristics and quality, socioeconomic and demographic characteristics of families, attitudes, aspirations, and value orientations with respect to housing, and two means by which a housing situation may be improved.

PB-210 129/3 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Prolonging Life of Wood in Houses
Ideas and methods exchange
J. Robert Dodge. Jun 67, 43p IME-47, TA/OST-AN-67-6-1
Revision of reports dated Jul 63 and Dec 57.

Keywords: Wooden structures, *Wood preservatives, Residential buildings, Tropical regions, Protection, Curing, Damage, Termites, Coal tar, Creosote, Phenol, Naphthenates, Copper organic compounds, Chlorine aromatic compounds, Drying, Poisons, *Houses, Wood preservation, Phenol/Pentachloro, Copper naphthenates.

Dwellings constructed entirely or in part of wood frequently deteriorate rapidly due to readily avoidable errors in the design of the structures and in the curing, use, or protection of the wood. This is especially true in the humid tropical areas with a high incidence of insect infestation. This document contains the most widely accepted information on the protection of wood. It is intended to serve as a reference and check list for housing technicians. The topics include: Sources of damage; protection against damage; wood preservatives; methods of treatment; soil poisons; air drying lumber; boilerless dry kilns; drying by solar radiation. (Author)

PB-210 130/1 PC A03/MF A01
Michigan State Univ., East Lansing.
Care and Maintenance of Farm Machinery. A Handbook for Farm Operations in Tropical Agriculture Areas
Norwin Braun. Jun 68, 49p TA/OST-AN-68-6-2
Prepared in cooperation with Nigeria Univ., Nsukka.

Keywords: *Agricultural machinery, Handbooks, Developing countries, Maintenance, Farms, Safety, Preventive maintenance, Tropical regions.

A functional farm workshop is a most valuable asset to any university farm. It is even more important in developing countries that are remote from ready access to machinery replacements, space parts, and company field men. In order to keep machinery in the best working condition, a thorough preventive maintenance program must be developed and closely adhered to. This handbook is intended as a guide for such a program. The first portion concerns itself with farm machinery safety; this is followed by a discussion of the structure and role of the mechanic section of a farm operations department. (Author)

PB-210 332/3 PC A12/MF A01
National Inst. of Community Development, Hyderabad (India).
Development and Change in a Bengal Village
Research rept.
Ajit Kumar Danda, and Dipali Ghosh Danda. May 68, 266p RR-20, TA/OST-AN-68-5-2
Report on the Diffusion of Innovations in Rural Societies. Prepared in cooperation with Michigan State Univ., E. Lansing. Dept. of Communication.

Keywords: *Social change, *India, Social communication, Developing countries, Attitudes, *Agriculture, Community relations, West Bengal(India), Technological change.

The report presents a study of the process of planned change in a village of West Bengal, India. It describes in general terms the positive and negative reactions of farmers toward specific agricultural programs. The special emphasis is on the determination of the causes of rejection of an improved agricultural practice. The communication process of conveying modern ideas and practices to the villagers was also examined. The report describes the physical setting of the village, community structure, development and change, and adoption of innovations. (Author)

PB-210 345/5 PC A05/MF A01
National Academy of Sciences, Washington, DC.
Science and Brazilian Development. Report of the Fourth Workshop on Contributions of Science and Technology to Development
Nov 71, 92p TA/OST-NAS-71-37
Contract AID/csd-1122
Prepared in cooperation with National Research Council of Brazil, Rio de Janeiro. See also PB-203 391-U.

Keywords: Research management, Economic development, *Brazil, Meetings, Research, Agriculture, Mineralogy, Geophysics, Chemistry, *Industrial development, *Research and development, Technology, Innovation(Technology).

The Fourth Brazil-U.S. Workshop on Science and Technology in Development had three primary objectives; (1) to review Joint Study Group Activities in agricultural research, agricultural economics, computer science, geosciences, and industrial research; (2) to review the operations of the chemistry program and discuss program strategy for 1972-74; and (3) to review the NAS-CNPq bilateral relationship and discuss future directs for joint activities. Recommendations of the workshop are summarized. Additional background information on which the recommendations depend is given in annexes to the report. (Author)

PB-210 507/0 PC E01/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Plant Requirements for Manufacture of Wallboard
Jun 67, 63 TA/OST-AN-67-6-2

Keywords: *Wallboard, Manufacturing, Industrial engineering, *Industrial plants, Developing countries, Operating costs, Requirements, Economic analysis.

The term 'wallboard' is applied to those construction materials which may be made from one of several types of fibrous residues, including bagasse, cereal straws, and cornstalks. These sheets are used in many ways in building construction, and the raw materials of which they can be made are to be found all over the world. This document provides a guide for the establishment and operation of a wallboard manufacturing plant. The topics covered include. Principles of wallboard manufacturing; the manufacturing process; building requirements; materials requirements; equipment requirements; labor requirements; overhead rate; unit cost of manufacturing; capital requirements; sales revenue; and projected profit and loss. Detailed operation sheets are given for each major step in the manufacturing process. (Author)

PB-210 508/8 PC A04/MF A01
National Inst. of Community Development, Hyderabad (India).
Communication in India. Experiments in Introducing Change
Joseph E. Kivlin, Prodipto Roy, Frederick C. Fliegel, and Lalit K. Sen. May 68, 64p TA/OST-AN-68-5-1

Keywords: Social communication, *India, *Social change, Developing countries, Literacy, *Education, Radio communication, Technological change.

An often encountered difficulty experienced by development programs involves gaining acceptance of beneficial changes by the populace. This document reports the results of a communication experiment which attempted to induce adoption of modern agricultural, health, and family planning practices by the inhabitants of a number of villages near Lucknow, Uttar Pradesh, India. The study sought to evaluate the continuing effects of two communication treatments: radio farm forums, and literacy training classes. The results indicate that while knowledge of the practices spreads rather quickly, adoption is slow and at low levels. Some progress was made, however, and clear cut differences in the effectiveness of the communication treatments were exhibited. (Author)

PB-210 512/0 PC A08/MF A01
Agency for International Development, Washington, DC. Office for Private Overseas Programs.
The VITA International Inquiry Service. An Evaluative Review
Richard Morse. Mar 72, 156p* Rept no. TA/OST-AN-72-3-1

Keywords: Information centers, Evaluation, Developing countries, Information retrieval, *Information services, Transfer of technology.

Volunteers for International Technical Assistance (VITA), operates a correspondence service which seeks to provide answers to technical inquiries from individuals in developing countries. Such inquiries are usually assigned to one of 5,500 volunteer experts in the U.S. and other nations for answer. This document is a result of a study undertaken to gain a better insight into present and potential achievements and problems of this voluntary approach to responding to technical information needs. It is intended for those interested in the task of adapting and transfering technical knowledge effectively; and for those specifically interested in VITA as a privately managed program through which individuals can contribute to overseas development.

PB-210 592/2 PC A21/MF A01
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
Transportation Technology for Development. Volume I
E. S. Cheaney, R. D. Leis, and D. M. Landreman.
Feb 68, 488p TA/OST-AN-68-2-1
Contract AID/csd-762
See also Volume 2, PB-210 593.

Keywords: Developing countries, *Transportation, Management, Construction, Manpower, Capacity, Vehicles, Maintenance, Economic development, *Pipeline transportation, Highway transportation, Rail transportation, Air transportation, Water transportation, Passenger transportation, *Cargo transportation, *Waterway transportation, *Road transportation, Technology, Modal choices, Intermodal cargo transportation.

This report provides background information on the technology of various transportation modes and their capabilities. It is intended primarily for use by economists, program officers, general engineers, and others in the economic development field. Information is included on the broad capacities of particular modes to handle freight and passenger traffic; major features and the advantages and limitations of each mode in terms of technical capabilities; levels of technological sophistication that can be adopted within each mode; and the 'inputs' of right-of-way preparation and construction, materials, vehicles, equipment, maintenance, and manpower required at each level to produce an 'output' of transport service. Volume One contains sections on: Intermodal factors of choice in transportation; highway transportation; railway transportation; conventional air transportation; V/STOL aircraft; inland waterway transportation; oceanway transportation; pipeline transportation; and intermodal freight exchange.

PB-210 593/0 PC A12/MF A01
Battelle Memorial Inst., Columbus, OH. Columbus Labs.
Transportation Technology for Development. Volume II
E. S. Cheaney, R. D. Leis, and D. M. Landreman.
Feb 68, 265p TA/OST-AN-68-2-2
Contract AID/csd-762
See also Volume 1, PB-210 592.

Keywords: Development countries, *Transportation, Monorail railways, Belt conveyors, Ground effect machines, Hydrofoil craft, Power supplies, Factor analysis, Cargo vehicles, Passenger vehicles, *Cargo transportation, Rail transportation, Aerial tramways, Off road vehicles, Technological factors, Special purpose vehicles.

The second volume of the transportation technology for development study contains sections on: Aerial tramway transportation systems; beltway (endless moving belt) transportation systems; monorail transportation systems; air cushion (or ground effect, surface effect) vehicle transportation systems; hydrofoil transportation systems; special purpose vehicles (i.e., those capable of moving over terrain away from established route networks); new power sources and their effect on transportation technology; external technological factors (food production, water supply, mining and mineral processing, petroleum production, power generation) and their influence on transportation needs.

PB-210 595/5 PC A03/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Economic Comparison of Overseas Manufacture and Importation of Anhydrous Ammonia
Mar 69, 29p TA/OST-AN-69-3-1

Keywords: *Ammonia, International trade, Developing countries, *Fertilizers, Economic analysis, India, South Vietnam, Uruguay, Cost estimates, Production, Chemical engineering, Imports.

Ammonia is the principal form in which fixed nitrogen is used in the manufacture of fertilizer materials. The production of ammonia by reacting hydrogen with atmospheric nitrogen is the basis of the modern nitrogen fertilizer industry. The report compares the economics in developing countries of importing ammonia from suppliers having large plants and low-cost feedstocks with those of producing the material under local conditions. Three countries, India, South Vietnam, and Uruguay, are used as a basis of the comparison. As these countries have widely divergent needs for fertilizer materials, the costs applicable to them should be representative of many other developing countries with similar needs and resources. (Author)

PB-210 596/3 PC A05/MF A01
Foreign Agricultural Service, Washington, DC.
Technological Change in Agriculture. Effects and Implications for the Developing Nations
Dana G. Dalrymple. Apr 69, 88p TA/OST-AN-69-4-2

Keywords: *Agricultural economics, Developing countries, Mass production, Grain crops, Agricultural machinery, Policies, Economic development, Project planning, Technological change.

The effects of technological changes in agriculture in the less developed countries are a matter of increasing concern. As efforts to expand agricultural production begin to pay off, the many and complex ramifications of technological change become more and more evident. This document provides an introduction to some of the major effects of technological change in agriculture. Included among the topics considered are: The nature of technological change; adoption process for agricultural technology; impact of changes in agricultural technology; high-yielding varieties of grain; mechanization of agriculture; and policy implications of technological change. (Author)

PB-210 597/1 PC A08/MF A01
Foreign Economic Development Service, Washington, DC.
An Analysis of the Potentials and Prospects of Increasing Edible Oil Production in West Pakistan
Frederic A. Coffey, D. M. Yermanos, J. R. Wilcox, B. M. Waddle, and P. F. Knowles. Sep 71, 170p FEDS-Field-11, TA/OST-AN-71-9-2

Keywords: *Vegetable oils, Developing countries, Production, Cottonseed, *Soybeans, *Peanuts, Safflower oil, Sesame oil, Oilseeds, West Pakistan, *Sunflower.

The report represents one phase of a study on the potential for increasing oilseed production in West Pakistan. It provides a review of research, production potential, and problems of oilseed production and processing in Pakistan and in the United States and other countries where relevant. It includes a general economic analysis as well as detailed discussions on the production of safflower, sesame, peanuts, soybeans, sunflowers, and cottonseed. (Author)

PB-211 367/8 PC A04/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Desert Encroachment on Arable Lands: Significance, Causes, and Control
Aug 72. 61p Rept no. TA/OST-72-10

Keywords: *Deserts, Stabilization, Arable land, Protection, Dunes, Soil stabilization, Water table, Cultivation, Soil erosion, Soil conservation, *Arid land, Desert encroachment, Dune progression, Water management.

Desert encroachment is a problem of significant economic consequence in a number of developing countries. The problem becomes more acute as population increases. The report gives an overview of the causes and significance of the problem and the state-of-the-art of control methods. It highlights causes and significance, gaps in knowledge and technology, and the nature and potential of recent efforts to control desert encroachment. (Author)

PB-211 420/8 PC A03/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Engineering Evaluation of Selected Fertilizer Production Facilities in Colombia
I. W. McCamy, and D. R. Waggoner. Aug 70, 43p Bull-Y-10, TA/OST-AN-70-8-1

Keywords: *Fertilizers, Developing countries, *Industrial plants, Evaluation, Production methods, Flow charts, Operating costs, Investments, Blending, Handling equipment, *Colombia.

The report is the result of a study by a team of experts of two segments of the Colombian fertilizer industry: (1) the facilities of Fertilizantes Colombianos, S.A. (FERTICOL), and (2) a sampling of small bulk-blending plants. The first part of the report provides general information about the fertilizer situation in Colombia. The results of the analysis of the FERTICOL plant are then presented. This includes flow diagrams of alternative production schemes, and projections of investment and operating costs. Similarly, operating problems are identified and alterations in equipment, raw materials, and procedures to improve operations are suggested for the bulk-blending plants. (Author)

PB-211 444/5 PC A05/MF A01
Iowa State Univ., Ames. Center for Agricultural and Rural Development.
Future Alternatives Affecting the Agricultural Demand for Water and Land: The Effects of Soy Protein Meats and Nitrogen Fertilizer Restrictions on Future Water and Land Use
Final rept.
Howard C. Madson, Earl O. Heady, Stanley H. Hargrove, and Kenneth J. Nicol. Jun 72, 93p* NWC-F-72-054
Contract NWC-72-012

Keywords: *Land use, *Agriculture, *Water resources, Food supply, Substitutes, *Fertilizers, Utilization, Soybeans, Meat, Proteins, Nitrogens, Irrigated land, Water consumption, Mathematical models, Forecasting, Linear programming, Soy protein concentrate.

The study evaluates the impact on land and water needs and farm prices if either soy protein meat analogs and extenders were substituted for part of the beef consumption in the year 2000 or nitrogen fertilizer application in the year 2000 were restricted to 100 pounds per acre and 50 pounds per acre. The study is based on a large-scale linear programming model of U.S. agriculture. Results of the soy protein meats policy models indicate that with soy protein meats accepted by consumers, productive capacity of U.S. agriculture would surpass any level previously experienced in this nation. Results of the two fertilizer limitation policy models indicate that a mild restriction on the use of nitrogen fertilizer would not strain the productive capacity of U.S. agriculture. A severe restriction, however, would reduce the supply capacity of U.S. agriculture considerably. (Author)

PB-211 473/4 PC A04/MF A01
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
Engineering Measures for Control of Schistosomiasis
Frederick E. McJunkin. Sep 70, 71p TA/OST-AN-70-9-2
Contract AID/csd-2487

Keywords: *Schistosomiasis, Control, Environmental engineering, Irrigation canals, Water quality, Parasitic diseases, Infectious diseases, Tropical regions, Developing countries, Bibliographies, *Diseases.

The water-related disease schistosomiasis (or bilharziasis) infects more people today than ever before in history, perhaps as many as 200 million people. Its increasing incidence and widespread prevalence are due in large measure to tropical irrigation and hydroelectric projects, implemented by engineers. This report provides background information on schistosomiasis and its control to enable engineers to work effectively with other professionals in design and operation of schistosomiasis control programs. It also seeks to improve understanding on the part of epidemiologists, malacologists, physicians, and others of the role of engineers in control of schistosomiasis. The present status of engineering measures for schistosomiasis control is summarized, and some possible approaches and opportunities for more effective control of schistosomiasis by engineers are outlined. A bibliography of relevant publications is included.

PB-211 487/4 PC A03/MF A01
National Academy of Sciences-National Research Council, Washington, D.C. Office of the Foreign Secretary.
The Central American Workshop on the Environment and Development. Antigua, Guatemala, July 25-30, 1971
Jul 71, 37p TA/OST-AN-71-7-3
Contract AID/csd-2584

Keywords: Economic development, *Central America, *Ecology, Developing countries, *Environmental impacts, Meetings, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Agriculture, Industries, Services, Regional planning, Education.

The primary goals of the Workshop were: to stimulate awareness of environmental factors in economic development among leaders in Central America; and to lay the groundwork for concerted actions within the established framework of the Common Market countries (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua). This document records the issues discussed and the conclusions reached. The focus of the workshop was upon the industrial, agricultural, and service industry factors. Consideration was also given to the human environment (principally population pressures), to planning at the regional level, and to educational consequences of environmental problems. (Author)

PB-211 628/3 PC A11/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Training Manual for Fertilizer Plant Operators
Oct 70, 247p* Circular-Z-17, TA/OST-AN-70-10-4

Keywords: *Fertilizers, Chemical plants, Manuals, Chemical engineering, Operators(Personnel), Developing countries, Conveyors, Dust collectors, Weight measurement, Fork trucks, Sampling, Packagings, Pumps, Compressors, Valves, Fluid filters, Chemical reactors, Centrifugal classifiers, Comminution, Refrigerating machinery, Maintenance, Safety, *Training.

The purpose of the manual is to assist in the training of fertilizer plant operators in the developing countries. It is an effort to share with the chemical industries in these countries experience that has been obtained over many years of operation at the National Fertilizer Development Center. Simple instructions, accompanied by abundant diagrams, are provided for all types of equipment to be found in most fertilizer plants. The topics covered include: Conveyors, elevators, crushers, screens, bins, tanks, dust collectors, weighing equipment, forklifts, front-end loaders, sampling, packaging, pumps, compressors, valves, pipeline flows, filtering equipment, absorption and spray tower, agitation, overhead cranes, common instrumentation, burners, centrifuges, heating and cooling equipment, granulating equipment, neutralization and reaction equipment, concentration equipment, refrigeration equipment, preventive maintenance, lubrication, and safety. (Author)

PB-211 629/1 PC A04/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Technical and Economic Evaluation of Fertilizer Intermediates for Use by Developing Countries
G. C. Hicks, R. D. Young, J. J. Stumpe, M. M. Norton, and M. J. Richards. Mar 70, 56p Bull-Y-3, TA/OST AN-70-3-1

Keywords: *Fertilizers, Developing countries, International trade, Economic analysis, Liquid ammonia, Nitrogen inorganic compounds, Liquids, Phosphoric acids, Phosphorus, India, Vietnam, Uruguay, South Vietnam.

In the past comparatively little emphasis has been placed on the position of fertilizer intermediates in supplying the fertilizer needs of the developing countries. This document provides an economic analysis of the prospects for fertilizer intermediates in the developing countries. An effort is made to rationalize the economic and practical examples by hypothetical planning exercises for the case of a few typical countries (India, South Vietnam, Uruguay) with large and small needs for fertilizers. The intermediates of primary concern are anhydrous liquid ammonia, low or nonpressure nitrogen solutions, phosphoric acid, and elemental phosphorous. (Author)

PB-211 640/8 MF A01
Forest Products Lab., Madison, WI.
Low-Cost Wood Homes for Rural America - Construction Manual
L. O. Anderson. May 69, 114p A/OST AN-69-5-1
Paper copy available from GPO as A1.76:364.

Keywords: *Houses, Wood, Construction, Manuals, Rural areas, *Wooden structures, Cost factors, *Building materials.

Improved housing for rural families means, in many cases, a home that is low in first cost, easily maintained and equipped for good family living. This manual provides details on the construction of such housing, with special reference to methods and materials which will hold down costs, but will insure quality. It gives step-by-step information on every phase of house construction, from the construction of the foundation or supporting units to the final painting and finishing. The manual may be particularly useful to those who plan rural housing efforts; the contractors and skilled and unskilled laborers who will be concerned with the actual construction. (Author)

PB-211 641/6 PC A04/MF A01
Foreign Economic Development Service, Washington, DC.
Food Marketing in Developing Countries
Bibliography series
Robert W. Taylor. Dec 71, 56p TA/OST AN-71-12-3
Also available as A.I.D. Bibliography Series-6.

Keywords: Food, Developing countries, *Marketing, Bibliographies, Abstracts, Indexes(Documentation), *Food supply.

The document brings together a summary of studies on the domestic marketing of food in the less developed countries which have been done by or for the Agency for International Development. It is essentially a bibliography with an abstract provided for each bibliographic entry. The entries ar arranged by general subject, by geographic region, and by commodity. A personal/corporate author index is included. (Author)

PB-211 642/4 PC A03/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Proposed Cooperative Fishery Program for Ecuador
H.S. Swingle. 25 May 71, 44p TA/OST AN-71-5-1

Keywords: Fisheries, *Ecuador, Projects, Aquaculture, Fishes, Shrimps, Reviews, Developing countries, *Fishery cooperatives.

The report is a result of a survey which was undertaken to determine how the U. N. Food and Agriculture Organization and the U.S. Agency for International Development could best coordinate their fisheries programs to provide joint assistance of most benefit to Ecuador. Some of the topics discussed are: Reorganization of the Departamentode Pisciculture; soils, water, and fish in the Oriente; the coastal area near Esmeraldas; and introduced species of fishes in Ecuador. In addition, an outline is provided for a proposed coordinated fisheries program. (Author)

PB-211 643/2 PC A03/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Fishculture Survey Report for Costa Rica
R. T. Lovell, and D. D. Moss. 1 May 70, 42p TA/OST AN-70-5-2

Keywords: Aquaculture, *Costa Rica, Developing countries, Surveys, *Fisheries, Education, Capital, Research.

The report presents observations and recommendations which are made as a result of a survey of the inland fisheries of Costa Rica. The survey was undertaken for the purpose of providing technical advice on freshwater fisheries research programs in the country and on developing programs for the production of fish for food by farmers or commercial investors. The topics covered in the report include: General conditions in Costa Rica which may affect fishculture considerations; government divisions responsible for fisheries development; fishculture research and training; and available sources of capital, land and feedstuffs. (Author)

PB-211 656/0 PC A06/MF A01
Foreign Economic Development Service, Washington, DC.
The Marketing Challenge. Distributing Increased Production in Developing Nations
Martin Kriesberg. Dec 70, 104p FEDS-7, TA/OST-AN-70-12-4

Keywords: *Marketing, Developing countries, Food, Meetings, Proceedings, Policies, Socioeconomic status, Project planning, Nutrition, Systems analysis, Problem solving, Surveys, *Food supply, Technical assistance.

Inadequate transportation and storage, poor market information, lack of capital, and other chronic marketing problems in developing countries have been dramatized by recent production increases. The document is based on a symposium which was organized to focus attention and resources on food marketing in developing nations. Topics covered include: Key considerations in marketing policies; marketing enterprises and the flow of resources into marketing functions; nutrition and marketing food for the needy; efficiency in the marketing system; regional experiences in marketing problems and priorities; and approaches to technical assistance.

PB-211 663/0 PC A06/MF A01
Auburn Univ., Ala. International Center for Aquacultures.
Inland Fisheries Progress in Thailand, 1971
H. S. Swingle, and E. W. Shell. 15 Jan 72, 117p TA/OST-AN-72-1-2

Keywords: *Fisheries, *Thailand, Developing countries, Aquaculture, Research, Project planning, Shrimps, Fresh water fishes, Parasites, Productivity, Statistical data.

The document provides a review and evaluation of the status of and the progress made by the Thailand inland fisheries program during 1971. Some of the topics covered are: Highlights of 1971 research results (village reservoir management, efficiency of various fish species, combined rice and fish culture, cage and pen culture of fish, freshwater shrimp culture); parasites affecting fish and man; problems arising in culture and marketing of Trichogaster pectoralis and Clarias Batrachus; Hatchery production and fish distribution; Department of Fisheries organization; titles of current and recently completed fisheries research projects; synopsis of physical and biological data for the fisheries units and the fisheries research stations; fisheries statistics (Author)

PB-211 669/7 PC A13/MF A01
Stanford Research Inst., Menlo Park, CA.
Marketing of Staple Food Crops in Tropical Africa: Overall Analysis and Report
Final rept.
William O. Jones. Jun 69, 280p TA/OST AN-69-6-6
Contract AID/csd-801

Keywords: Food, Developing countries, *Marketing, Supply(Economics), Urban areas, Commerce, Diets, Efficiency, *Subsaharan Africa, Kenya, Nigeria, *Food supply, Sierra Leone.

The report is an end product of a study undertaken to identify practical methods for increasing the efficiency with which staple foodstuffs are marketed in tropical Africa. It describes the structure of selected food marketing systems in tropical Africa in terms of product flow, exchange levels, personnel, and marketing; it appraises the performance of the system; and it identified measures that might be adopted to improve its efficiency. The specific subjects of the report are the trade in staple foodstuffs in the supply hinterlands of four major cities: Nairobi, Kenya; Enugu, Nigeria; Ibadan, Nigeria; and Freetown, Sierra Leone. (Author)

PB-211 671/3 PC A04/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Aquacultural Developments in Peru
D. C. Moss. 30 Apr 72, 57p TA/OST-AN-72-4-2

Keywords: *Aquaculture, *Peru, Developing countries, Fisheries, Personnel development, Research.

As part of an overall effort to reduce the outlay of foreign exchange for the importation of beef, the Government of Peru is striving to develop to the fullest extent the country's fisheries resources. An important part of this effort involves aquaculture. This report reviews the present status of aquaculture in Peru and provides a series of recommendations for future development. Some of the topics covered include the potential for coldwater and warmwater fishculture; a proposed project for culturing fish in pens; a proposed warmwater aquacultural research station; organizational structure of the Ministry of Fisheries; existing fisheries stations and equipment; and fisheries personnel and their training. (Author)

PB-211 672/1 PC A03/MF A01
Rutgers - The State Univ., New Brunswick, N.J. Dept. of Food Science.
Corn Fortification: A Field Demonstration Model
Leonardo J. Mata, Ricardo Bressani, Paul A. Lachance, and Miguel A. Guzman. 12 Jun 71, 45p TA/OST-AN-71-6-3

Keywords: Nutrition, Developing countries, Corn, Additives, Nutritional deficiencies, Proteins, Experimental design, Guatemala, Central America, *Food fortification.

Protein deficiency is a major problem in Central America, as it is in most societies throughout the world that occupy similar ecosystems. An apparent measure to correct this deficiency in utilizable protein would be to increase the production and consumption of animal protein, but the approach has very serious economic and socio-cultural limitations. A nutrition improvement approach that appears to be feasible is the fortification of a food that is normally part of the regular diet to a level sufficient to correct the protein deficiency. In the Central American countries corn, which is consumed primarily in the form of tortilla, would seem to lend itself well to this technique. This document outlines a proposed field methodology to determine the feasibility of the corn fortification approach at the community level. (Author)

PB-211 761/2 PC A06/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
A Fertilizer Program for Bolivia
D. A. Russel, R. J. Ballow, J. I. Bucy, and D. A. Waitzman. Jun 70, 114p Bull-Y-9, TA/OST-AN-70-6-7

Keywords: *Fertilizers, Developing countries, International trade, Wheat, Productivity, Marketing, Potatoes, Rice, Fruit crops, Coffee trees, Oilseed crops, Sugarcane, Benefit cost analysis, Tables(Data), *Bolivia.

Bolivia annually imports over $23 million of agricultural products, including wheat, edible oils, fibers, and dairy products. Wheat is by far the most costly of these imports, and it also seems the most amenable to increased domestic production through the use of new varieties and fertilizers. With lower costs, fertilizer could also be profitably used on such crops as corn, quinoa, rice, cotton, and sugarcane. This document provides a review of the fertilizer program in Bolivia, evaluates its need for fertilizer plants, and analyzes the possibilities for fertilizer marketing. (Author)

PB-211 762/0 PC A05/MF A01
Agency for International Development, Karachi(Pakistan).
The Feasibility of Harvesting, Processing and Marketing Tuna in Pakistan
Alvin M. Morgan, S. A. Jalil, Masood A. Burney, Douglas M. Jones, and James G. Unti. 1970, 96p TA/OST AN-70-13-3
Prepared in cooperation with Government of Pakistan, Dept. of Fisheries.

Keywords: Fisheries, Developing countries, *Pakistan, Tunas, *Food processing, Fishing grounds, Coasts, *Marketing, Economic development, Canning, Freezing, *Fishes.

The geographical locale of Karachi, with access to known productive tuna fishing areas along with a coastal population of traditional fishermen, are favorable considerations in the development of a deep sea tuna fishing industry for Pakistan. There is an increasing world demand for both frozen and canned tuna, especially in the highly industrialized nations of the world. This market offers the opportunity for Pakistan to earn foreign exchange for such other goods that are required for industrial expansion and economic development. This report is primarily concerned with two aspects of tuna fishery development: a fishery fleet, and a fish cannery. (Author)

PB-211 774/5 PC A03/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Fisheries of Turkey
H. S. Swingle. 20 Jan 72, 28p TA/OST-AN-72-1-3

Keywords: *Fisheries, Developing countries, *Turkey, Aquaculture, Food, Population(Statistics), Chemical laboratories, Laboratory equipment, Water chemistry, Limnology.

The document briefly reviews the status of the Turkish fisheries program, and provides some recommendations for possible development. The topics covered include: Food and population; water areas and fisheries; government divisions and universities dealing with fisheries; possibility of fisheries in the poppy-growing areas. Also included are a list of equipment and chemicals needed for a basic water chemistry laboratory; a list of equipment needed for a basic limnological research laboratory; and a brief list of references of possible use in identifying fishes of Turkey. (Author)

PB-211 775/2 PC A04/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Status of Trout Culture in Peru
E. W. Shell. 15 Aug 71, 54p TA/OST-AN-71-8-1

Keywords: Aquaculture, Developing countries, *Peru, Trout, Fisheries, Evaluation, *Fishes.

The document reports the results, and provides recommendations based on those results, of a survey of trout hatcheries and trout farms in Peru. The purpose is to evaluate the potential for trout farming in Peru and to evaluate certain aspects of the Ministry of Fisheries' proposed program for the development of the trout farming industry. (Author)

PB-211 843/8 PC A03/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Recommendations for FECOAGROH Grain Storage and Handling Facilities in Honduras
Rept. no. 21
Elwyn S. Holmes. Jul 71, 44p TA/OST-AN-71-7-4
Contract AID/csd-1586
Report on Food Grain Drying, Storage, Handling and Transportation.

Keywords: *Grains(Food), *Food storage, *Honduras, Food processing, Warehouses, Structural design, Materials handling equipment, Drying, Developing countries.

The report provides details concerning the development, design, and evaluation of grain receiving, storage, and handling facilities for the National Federation of Agricultural Cooperatives (FECOAGROH) in Honduras. Detailed descriptions and plan views are given of recommended facilities. An appendix lists U. S. manufacturers and suppliers of equipment referred to in the report. The document may be of interest to those planning grain storage and handling facilities elsewhere.

PB-211 882/6 PC A04/MF A01
Foreign Economic Development Service, Washington, DC.
A Review of Certain Aspects of the Forestry Program and Organization in Indonesia
Burnett H. Payne, and David S. Nordwall. 23 Apr 71, 62p FEDS-Field-10, TA/OST AN-71-4-1

Keywords: *Forestry, *Indonesia, Developing countries, Forest land, Organizations, Classifications, Protection, Reforestation, Statistical data, Marketing, Productivity.

Indonesia's forest resources represent one of her most valued assets. These resources are not inexhaustable, however, and it is essential to protect them from destructive exploitation. This report provides a review of timber operations in Indonesia, identifies problem areas, and offers a series of recommended solutions. Emphasis is placed on the organization of the Directorate General of Forestry; the use of forest lands, particularly with respect to the granting of timber concessions; the forestry research program; and environmental considerations. (Author)

PB-211 883/4 PC A05/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Observations and Recommendations for Improving Grain Storage and Marketing in Bolivia
Rept. no. 22
Floyd F. Niernberger, and Harry B. Pfost. May 71, 96p TA/OST-AN-71-5-2
Contract AID/csd-1566
Report on Food Grain Drying, Storage, Handling and Transportation.

Keywords: *Grains(Food), *Food storage, *Bolivia, *Marketing, Transportation, Wheat, Rice, Corn, Soybeans, Warehouses, Evaluation, Food sanitation, Developing countries.

The report provides an evaluation of storage and related marketing requirements for the development of the wheat, rice, corn, and soybean industries in Bolivia. Both observations on present conditions and recommendations for future development are given. A 27-page appendix presents detailed guidelines for determining the capacity of various components of a grain storage facility, which should prove generally useful to those interested in this field.

PB-211 909/7 MF A01
Dow Chemical U.S.A., Midland, MI. Functional Products and Systems.
A Literature Search and Critical Analysis of Biological Trickling Filter Studies - Volume I
Water pollution control research series.
Dec 71, 330p EPA-17050-DDY-12/71-1
Contract FWPCA-14-12-474
See also Volume 2, PB-211 910.
Paper copy available from GPO as EP2.10:17050DDY12/71.

Keywords: Trickling filtration, Reviews, *Sewage treatment, Industrial waste treatment, History, Design, Maintenance, Performance evaluation, Research, Patents, Cost estimates, Ecology, Aerobic processes, Trickling filters, Chemical industry, Food processing, Laundries, Water pollution, Agricultural wastes, Metal industry, Drug industry, Fermentation, Paper industry, Radioactive waste processing, Textile industry, *Water pollution, Biological industrial waste treatment, Brewing industry, Military facilities, Poultry processing, Tanneries, Water pollution control.

A two volume compilation, review and critique of the literature on biological trickling filter studies and related pollution abatement processes have been made. In the report, the literature review and critical analysis, is divided into: Introduction, definitions, history and background theory of the trickling filter process; Plant design, materials of construction, operation, maintenance and performance; Trickling filter research and development approaches, ecology, and patents, and Applications of trickling filter to specific industrial wastes. Based on the review, several general conclusions were drawn. There is no well-defined theory of design and operation. Much published work was redundant, and European efforts were not readily accepted in the United States, and vice versa. The literature reflects cycles of interest in trickling filters. The process is not applicable to all pollution problems, but its shock survival capabilities and rapid flow-through time are definite advantages which cannot be overlooked in any design of a waste treatment facility.

PB-212 001/2 PC **A05**/MF **A01**
General Oceanology, Inc., Cambridge, MA.
Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume II, Part I. Chile, Investment Aspects and General Summary
Final rept.
Gerald D. Bernstein. 26 Jun 70, 78p GO-12-Vol-2-Pt-1, TA/OST-AN-70-6-5
Contract AID/csd-2158
Prepared in cooperation with American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc. See also Volume 1, PB-195 913 and Volume 2, Part 2, PB-212 002.

Keywords: *Fish protein concentrates, *Chile, Developing countries, Food industry, Feasibility, Systems engineering, Marketing, Organizations, Competition, Financing, Proteins, Cost analysis, Investments, Food processing.

The report analyzes the feasibility of commercial production of fish protein concentrate (FPC) in Chile. This first Part consists essentially of summaries and condensations of the significant portions of the study, with enough detail to enable it to stand as an independent document. The topics covered include: The Chilean food system and the potential market for FPC; the isopropyl alcohol process and possible competitors; cost of FPC production; company organization and financing structure for an FPC enterprise in Chile; and alternative protein sources.

PB-212 002/0 PC **A13**/MF **A01**
General Oceanology, Inc., Cambridge, MA.
Commercial Feasibility of Fish Protein Concentrate in Developing Countries. Volume II, Part II. Chile, Background Information and Supporting Data
Final rept.
Gerald D. Bernstein. 21 Jul 70, 290p GO-12-Vol-2-Pt-2, TA/OST-AN-70-6-6
Contract AID/csd-2158
Prepared in cooperation with American Technical Assistance Corp., and Sidney M. Cantor Associates, Inc. See also Volume 2, Part 1, PB-212 001.

Keywords: *Fish protein concentrates, *Chile, Developing countries, Food industry, Feasibility, Marketing, Food processing, Fishes, Cost analysis, Proteins, Nutrition, Investments, Industrial plants, Curico Province(Chile), Fortified foods.

The report analyzes the feasibility of commercial production of fish protein concentrate (FPC) in Chile. This second Part of the report provides detailed information from which the discussions and conclusions of Part 1 were drawn. The subjects covered include: The Chilean food situation and market for FPC; proposed specifications and quality characteristics for FPC; selection of process and plant capacity; plant design and construction; process description; raw fish supply; cost of production and investment for a fish protein concentrate plant; modified FAO provisional pattern for protein; relationships among income, food distribution, and per capita calorie and protein intakes in Chile; survey of nutrition and health patterns in Chile; acceptability of fortified foods in the province of Curico.

PB-212 034/3 PC **A08**/MF **A01**
Agency for International Development, Washington, DC.
Introduction to Record Keeping in a Small Enterprise
R. F. Bruckart. May 68, 154p TA/OST-AN-68-5-3
Prepared in cooperation with the Industrial Development Center, Zaria (Nigeria).

Keywords: Records management, Manuals, Industrial plants, *Nigeria, Management engineering, Commerce, Developing countries, Supervisors, Statistical data, *Management techniques, *Small businesses.

Much experience is available on the fundamental methods employed by managers of small businesses in industrially developing countries who have developed profitable operations. Effective record-keeping, it has been found, is one of the methods. The document introduces basic record-keeping methods similar to those that managers of small industries throughout the world have found useful. The topics covered include: Recording daily transactions; planning and controlling production; records of material or supplies; quality control records; employee records; and how the manager uses records. The document was prepared for use by small-enterprisers in Northern Nigeria, but it should be generally applicable elsewhere.

PB-212 035/0 PC **A06**/MF **A01**
Geological Survey, Reston, VA.
Hydrology and Water Resources Development in Nepal
Open file rept.
W. W. Evett. Jun 69, 112p TA/OST-AN-69-6-7

Keywords: *Nepal, *Water resources, *Hydrology, Ground water, Economic development, Rivers, *River basin development, Developing countries, South Asia.

Water has long been recognized as one of Nepal's most promising resources. Yet, prior to 1960 little had been done to investigate and appraise the resource. By 1969, a nationwide network of hydrological stations had been established, and a ground-water exploration effort had begun. Furthermore, the Department of Hydrology and Meteorology had been established, staffed, and equipped to conduct investigations. The report discusses the history of hydrological investigations in Nepal, and the relation of these investigations to the social and economic problems of water-resources development and management. The general hydrology of the more important river systems of the country is described in detail. (Author)

PB-212 101/0 PC **A04**/MF **A01**
Cornell Univ., Ithaca, NY.
Plant Protection Problems in Southeast Asia
Edward H. Glass, Roy J. Smith, Jr, Ivan J. Thomason, and H. David Thurston. 1971, 74p TA/OST AN-71-13-1
Contract AID/csd-3296
Prepared in cooperation with East Asian Pest Management Study Team, and California Univ. Sponsored in part by Agricultural Research Service, Washington, DC.

Keywords: Plants(Botany), Pest control, *Southeast Asia, Insect control, Crop weeds, Plant diseases, *Pesticides, Developing countries, *Crops.

Improved crop protection can do little to reduce the population explosion in East Asia, but it can make important contributions toward assuring an adequate food supply until populations become stabilized through family planning and birth control. This document is the report of a study team which has as its objective the appraisal of the nature and the scope of pest problems affecting food production in the Philippines, Thailand, Malaysia, Taiwan, Hong Kong, Singapore, and Japan. An effort was also made to determine whether the local environment and public health are endangered by improper use and lack of management of pesticides on food and other major crops. Specifically, consideration is given to the status and needs of crop protection in Tropical East Asia; economic and environmental implications of crop protection; possible approaches to solutions of crop protection problems; some international and foreign agencies in plant protection activities in tropical East Asia; and pesticides in public health activities.

PB-212 238/0 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Fisheries
Bibliography Series.
1 Jun 71, 62p Rept no. Agriculture-5

Keywords: *Fisheries, Bibliographies, Developing countries, *Fish protein concentrates, Marketing, Food processing, Surveys, Research, Economic development, Africa, Asia, Latin America.

The Bibliography is designed to provide information on fisheries programs, projects and research in newly developing countries. It includes a general section on such topics as fish processing, protein concentrates, marketing, research and training as well as regional sections which cover a variety of surveys and reports of many aspects of fisheries activities in individual countries in Africa, Asia and Latin America. Annotations are descriptive of content and include author, title, source of publication and identifying number.

PB-212 359/4 PC-**GPO**/MF **A01-NTIS**
Clemson Univ., S.C. Dept. of Textiles.
State of the Art of Textile Waste Treatment
Water pollution control research series rept.
Feb 71, 356p EPA-WQO-12090-ECS-02/71
Paper copy available from GPO as EP2.10:12090-ECS-02/71.

Keywords: *Textile industry, Industrial waste treatment, *Water pollution, *Industrial wastes, Reviews, Bibliographies, Inventories, Synthetic fibers, Natural fibers, Lagoons(Ponds), Activated sludge process, Trickling filtration, Detergents, Dyes, Sludge disposal, Industrial engineering, Cost estimates, Legislation, State government, Government policies, Textile finishing, Sizing materials, Cotton fabrics, Woolen textiles, Rayon, Acetate fibers, Polyester fibers, Acrylic fibers, Public law, *Waste treatment, Water pollution control, Biological industrial waste treatment, Tertiary sewage treatment, Water pollution abatement.

A study has been made of waste treatment methods and practices used in the textile industry. Information was obtained from people working in the textile processing industry, designing waste treatment plants, and enforcing state and federal regulations on waters discharged to streams and natural reservoirs. To supplement this information the literature was reviewed and an annotated bibliography prepared. The report contains sections on the following: characteristics of textile waste, waste treatment techniques, treatment methods in use, effects of textile wastes on receiving waters, the cost of waste treatment operations, and state and federal regulations governing discharge waters. Areas of needed research are recommended. The annotated bibliography contains references on synthetic fiber manufacturing wastes, detergent waste treatment, instrumentation, plant design, water treatment for plant use as well as articles pertaining specifically to textile waste treatment.

PB-212 371/9 PC **A06**/MF **A01**
Agency for International Development, Manila (Philippines).
Housing and Urban Development in the Philippines
Bernard Wagner. Jan 68, 101p TA/OST-AN-68-1-2

Keywords: Residential buildings, Project planning, Urban development, *Philippines, Developing countries, Reviews, Problem solving, Requirements, Organizations, Management, *Housing, Low income groups, Middle income groups.

The document contains a series of papers on housing and urban development problems in the Philippines. Topics included are housing needs and a proposed action program, urban development in Mindanao, reorganization of the home financing commission, modification of the administration of housing and urban programs, the squatter problem, urban planning in the Iligan area, housing of middle and lower income groups, housing investment by insurance companies, and comments on the Draft Administrative Code.

PB-212 372/7 PC **A03**/MF **A01**
Agency for International Development, Washington, DC.
Leader Training for Aided Self-Help Housing
Jun 69, 40p Rept no. TA/OST-AN-69-6-8

Keywords: Residential buildings, Developing countries, Construction, Manuals, Leadership, Specialized

training, Project planning, Evaluation, Production engineering, Socioeconomic status, Problem solving, Methodology, Recommendations, Reviews, *Training, *Housing, Self help housing, Aided self help housing, Low cost housing, Leader training.

Aided self-help housing is described as a natural way to better homes in the less industrialized areas of the world, can often be reached most effectively through trained local leaders. It is the purpose of this manual to present material useful for conducting a course for such local leaders. The following topics are included: Advantages and disadvantages of this technique for producing homes; examples and case studies demonstrating how aided projects have been carried out by others; various planning principles affecting aided self-help housing; development of skills in construction techniques; material, labor, and financial resources; problems of communicating ideas for low cost housing; and proposals for initiating an aided self-help housing program.

PB-212 632/4 PC A17/MF A01
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.
Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book I
Apr 70, 382p TA/OST-AN-70-4-1
Contract AID/VN-54
See also Book 2, PB-212 633.

Keywords: Pulp mills, Paper industry, *South Vietnam, Feasibility, Developing countries, Market research, Expenses, *Pulp, *Paper, *Industrial plants.

Vietnam has a variety of fiber resources which in total constitute an adequate raw material for a pulp and paper industry. The present paper industry was built with only the domestic market in mind, and currently it is entirely dependent on import of pulp. Under these circumstances of small size and imported raw material, the paper industry in Vietnam suffers from high costs. This study examines the feasibility of developing a viable pulp and paper industry in Vietnam in the early post-war period. The scope of the study includes: A review of the existing industry, including facilities, capacities, capabilities, and cost factors; a survey of present and possible future markets, both domestic and in neighboring Southeast Asian countries; a survey of indigenous fibrous raw materials, including types, amounts available, location, and cost; a proposal of location, number, type, and capacity of new facilities; and a calculation of grade costs, net realization, and financial soundness of the proposed facilities.

PB-212 633/2 PC A14/MF A01
Miner (Thomas H.) and Associates, Inc., Chicago, Ill.
Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book II
Apr 70, 310p TA/OST-AN-70-4-2
Contract AID/VN-54
See also Book 1, PB-212 632.

Keywords: Pulp mills, Paper industry, *South Vietnam, Feasibility, Developing countries, Market research, Expenses, *Pulp, *Paper, *Industrial plants.

The volume is comprised of appendices intended to accompany Book I of this study. The topics covered include: Marketing prospects for export; raw materials for a proposed kraft mill near Dalat; methods, equipment, and estimated costs for bamboo extraction at Phuoc Binh; summary of U. S. Forest Products Laboratory tests; materials, supplies, and unit costs; summary of corporate taxation and examptions; core making plant; bamboo harvesting report; bagasse report; 250 ton integrated kraft mill.

PB-212 726/4 PC A05/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Forestry in Developing Countries. Potentials, Constraints, and Opportunities
Gordon D. Fox. Oct 72, 76p Rept no. TA/OST-72-12

Keywords: *Forestry, Developing countries, Forest trees, Economic development, Wood products, Structural timber, Reforestation, Utilization, Transportation, Research, Management.

With about one-half of the world's forest area located in the developing countries, adequate forest programs to manage and exploit this renewable natural resource are an important aspect in economic development. This preliminary analysis focuses on the following issues: principal factors inhibiting better management of forest resources; technical aspects of these inhibiting factors; practical steps that might overcome these problems; and likely impact on timber resources and utilization if such steps were taken.

PB-212 748/8 PC A03/MF A01
Yale Univ., New Haven, Conn. Economic Growth Center.
The Role of the Industrial Sector in Korea's Transition to Economic Maturity
Gustav Ranis. Oct 71, 37p EGC-DP-125, TA/OST AN-71-10-4
Contract AID/csd-2492

Keywords: Economic development, Industries, *South Korea, Developing countries, Economic analysis, Unskilled workers, Japan, Taiwan, *Industrial development.

Korea belongs to the category of developing country which have small, therefore open, labor surplus dualistic economies, characterized by a relative lack of natural resources and an abundance of unskilled labor at the outset. This paper begins with a definition of the 'ideal' growth pattern for this type of economy. A review is then provided of the actual Korean experience relative to this ideal. Korean performance in this respect is contrasted to two other countries belonging to the same family; i.e. Japan, historically, and Taiwan in the post-war period. Consideration is given to the initial conditions and to the similarities and differences of the transition processes in the countries. Finally, the implications of this analysis with respect to further research and policy are discussed.

PB-212 749/6 PC A04/MF A01
Harvard Univ., Cambridge, Mass. Center for International Affairs.
Equitable Distribution of Benefits in Integration Schemes Among the Less Developed Countries: The Andean Group
David Morawetz. Apr 72, 67p Economic Development-216, TA/OST AN-72-4-3
Contract AID/cds-1543

Keywords: Economic development, Treaties, Developing countries, Distribution systems, Commerce, Inequalities, Agreements, Economic analysis, Bolivia, Chile, Colombia, Ecuador, Peru, *Socioeconomic status, Economic integration, Andean Group customs union.

All economic integration schemes among less developed countries which have been established to date have foundered on the problem of how to equitably distribute the benefits arising from hte existence of the scheme. The Cartagena Agreement of the Andean Group customs union (Bolivia, Chile, Colombia, Ecuador, and Peru) includes several measures bearing on this problem. The paper provides a theoretical analysis of the benefit distribution problem, and an evaluation of the benefit distribution provisions of the Cartagena Agreement. Consideration is given to the definition of an 'Equitable' benefit distribution, some problems in measuring net benefits, and the presumptions as to whether benefits are likely to be equally or unequally distributed in integration schemes. A number of schemes which have been proposed and/or adopted to achieve equitable benefit distribution are then examined from a theoretical viewpoint. The measures contained in the Cartagena Agreement are analyzed in the light of this examination, and of the experience of other integration schemes with the benefit distribution problem.

PB-212 779/3 PC A06/MF A01
Nathan (Robert R.) Associates, Inc., Washington, DC.
An Evaluation of Recent Private Industrial Development in Nicaragua
Jan 71, 109p TA/OST-AN-71-1-1
Contract AID/La-650

Keywords: *Industrial development, *Nicaragua, Economic development, Foreign aid, Financing, Developing countries, Industries, Investments, Capital, Small businesses.

In the mid-1960's, the Agency for International Development decided that the Nicaraguan industrial sector needed access to investment capital to finance a backlog of projects. AID met this need by making $17 million available to create and strengthen intermediate credit institutions to mobilize capital, both foreign and domestic. This report provides an assessment of the efficacy of the AID programs to the private industrial sector of Nicaragua and suggests changes that might improve them. Specifically, consideration is given to the following: Past rate of growth; prospects for industry in Micaragua; strategic factors in industrial expansion; shortage for working capital and the debt/equity problems; cost of AID capital; investment climate in the industrial sector; aid contribution to meeting long-term capital needs; strengthening the capacity of the National Development Institute (INFONAC); creation of a new private investment bank; AID loan program as a stimulant to domestic savings; loans to small businesses and artisans; providing technical assistance; performance and impact of the industrial sector in recent years.

PB-212 784/3 PC A16/MF A01
Agency for International Development, Washington, DC. Office of Program and Policy Coordination.
A Firsthand Study of Industrial Management and Economic Development in India
Dec 69, 368p TA/OST-AN-69-12-1

Keywords: Industrial management, *India, Economic development, Developing countries, Management, Environments, Benefit cost analysis, *Industrial development, Transfer of technology.

The document represents an effort to develop guidelines that can serve as a basis for effective action by managements of individual Indian enterprises in their attemps to adapt to and reduce the impact of negative environmental conditions on their performance. It also seeks to determine the extent to which managerial practices, techniques, concepts, policies, principles, and general know-how which tend to be effective on a relatively widespread scale in U. S. industry can be transferred and/or applied successfully to a developing country such as India. Consideration is given to the costs and benefits involved in the transference process, and to the degree that the Indian environment seriously constrains or prevents such transference. In addition, attention is given to the development of guidelines and meaningful priorities that indicate what action might best be taken by public authorities in dealing with environmental constraints which seriously hinder managerial performance and productive efficiency at industrial enterprises.

PB-212 916/1 PC A20/MF A01
Stanford Research Inst., Menlo Park, CA.
Costs of Urban Infrastructure for Industry as Related to City Size in Developing Countries. India Case Study
Om Prakash Mathur, Richard Morse, and M. C. K. Swamy. Oct 68, 453p TA/OST-AN-68-10-2
Contract AID/csd-802
Prepared in cooperation with School of Planning and Architecture, New Delhi, India, and Small Industry Extension Training Institute, Hyderabad, India.

Keywords: Urban development, *India, Industries, Economic development, Benefit cost analysis, Developing countries, Municipalities, Magnitude, Populations, *Industrial development, Urban infrastructure.

The document provides the details of a study which was designed to measure the direct costs of equipping cities of different size for industrial development, including the costs of social infrastructure for new urban industrial employees and their families. It is orientated primarily to the situation in developing economics and is centered on the industrial growth requirements of selected cities in the states of Punjab, Haryana, and Uttar Pradesh, in northern India. An examination is made of the widely held belief that unit costs of incremental infrastructure for new industry tend to be relatively high in smaller cities, to decrease over some intermediate range of city sizes, and to rise significantly beyond some large city size. Consideration is given to both the effect of city size on costs, and to the combined effect of costs when composition of industry varies with city size.

PB-212 941/9 MF A01
National Academy of Sciences, Washington, DC.
Genetic Vulnerability of Major Crops
1972, 315p

International Standard book no. 0-309-02030-1. Library of Congress catalog card no. 72-77533. Sponsored in part by Research Corp. of New York and the Department of Agriculture, Washington, D. C.
Paper copy available from National Academy of Sciences, 2101 Constitution Ave., Washington, DC. 20418.

Keywords: Plant genetics, Plant diseases, Farm crops, Fungus diseases, Plant pathology, Epidemiology, Corn plants, Wheat plants, Rice plants, Leguminous plants, Soybean plants, Cotton plants, Vegetable crops, Economic analysis, *Wheat, *Rice, *Vegetables, *Soybeans, *Crops, Corn blight.

The report provides the scientific community and the general public with a description of the circumstances surrounding the 1970 corn blight epidemic, and assessment of the genetic bases of other food and fiber crops, and an evaluation of their potential susceptibility to severe epidemics. This informative study presents the views of plant breeders and pathologists, geneticists, entomologists, plant physiologists, economists, and investigators knowledgeable in the production of major crops. These experts suggest ways to deal with the challenges that genetic uniformity in crops pose to the scientific community and the nation.

PB-212 974/0 MF **A01**
National Academy of Sciences, Washington, DC.
Soils of the Humid Tropics
Jun 72, 229p
Library of Congress Catalog Card no. 78-189475. International Standard Book No. 0-309-01948-6.
Paper copy available from the National Academy of Sciences, Printing and Publishing Office, 2101 Constitution Ave., N. W., Washington, DC. 20418.

Keywords: *Soils, Tropical regions, Arable land, Soil surveys, Mapping, Soil structure, Soil classification, Fertilizers, Porosity, Soil chemistry, PH, Cation exchanging, Soil fertility, Aluminum, Potassium inorganic compounds, Phosphorus inorganic acids, Sulfur oxides, Silicon dioxide, Manganese, *Latin America.

Throughout the world there are approximately 1.6 billion hectares of potentially arable land that is not now under cultivation. Half of this uncultivated land lies in the tropics where climatic and soil conditions offer a high potential for crop production. If only 2 percent of this land could be cultivated under modern technological principles, enough food would be produced to feed the current population of Latin America. A committee of soil scientists under the auspices of the Agricultural Board of the National Research Council has prepared Soils of the Humid Tropics, a report that identifies research priorities and offers recommendations for better use of this agricultural resource. (Author)

PB-213 023/5 PC **A03**/MF **A01**
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
A Universal Solar Kitchen
C. J. Swet. Jul 72, 27p* Rept no. APL/JHU-CP-018

Keywords: *Kitchen equipment and supplies, *Solar energy, Solar radiation, Cooking devices, Water heaters, Cost, Performance(Engineering), Tracking(Position), Heat transfer, Convection, Solar kitchens.

The widespread domestic use of solar energy would significantly reduce air pollution and conserve vital resources, especially in populous developing regions where many families burn foraged firewood, vegetable waste, or dung. However, currently available solar cookers, ovens, and water heaters have failed to gain general acceptance where they are needed most, mainly because of their limited utility and poor compatibility with traditional life styles. Recent studies indicate that these shortcomings can be largely removed by innovative applications of existing technology. It now appears possible to produce at reasonable cost a universal solar kitchen that can satisfy most of the usual domestic requirements for thermal energy. The basic design is adaptable to a wide variety of ethnic and regional domestic practices, is readily transportable, and requires no special skills for installation or use. A conceptual approach to the design of universal solar kitchens is presented, with nonrigorous indications of feasibility, performance, producibility, and cost. Two possible embodiments are described, with primary emphasis on the collection of the solar energy and its delivery to a convenient point of use or storage. (Author)

PB-213 181/1 PC **A05**/MF **A01**
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.
Determination of the Rate of Biodegradation in Some Polluted Tropical Waters and in Some Types of Liquid Wastes Common in Puerto Rico
Completion rept.
Luis A. del Valle. Sep 72, 85p OWRR-A-023-PR(1)

Keywords: *Puerto Rico, Biochemical oxygen demand, Tropical regions, *Water pollution, Sewage, Biodeterioration, Industrial wastes, Reaction kinetics, Temperature, Computer programs, Sewage treatment effluent.

The first part of the study evaluates methods for the determination of deoxygenation (biodegradation) rates of polluted waters in Puerto Rico. The experimental part of the study was divided into three phases. The first phase consisted in working with the waste as it came from the particular source to determine its value of K (biodegradation constant) in its original state. The second and third phases of the study consisted in diluting the waste with natural river and sea water to simulate the condition of the waste when discharged into a natural body of water. The degree of dilution does not seem to have any significant effect. On the other hand, when the dilution water is sea water the value of K tends to be higher than when the waste is diluted in fresh water. (Author)

PB-213 442/7 PC **A05**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Impregnation of Concrete Pipe
Jun 71, 78p EPA-11024-EQE-06/71
Contract EPA-14-12-835

Keywords: Concrete pipes, Impregnating, *Corrosion, Sewers, Permeability, Polymers, Coal tar, Linseed oil, Sulfur, Urea, Formaldehyde, Exposure, *Pipes(Tubes), *Concrete.

The program was undertaken to investigate methods to increase the corrosion resistance, increase the strength, and reduce the permeability of concrete used in sewer line applications by impregnating the concrete pipe with relatively low cost resins such as asphalt, coal tars, linseed oil, sulfur, urea-formaldehyde, and others. Methods to accomplish this end were achieved and the materials, techniques of application, test results and economics are presented in this report. (Author)

PB-213 537/5 MF **A01**
Metropolitan Sanitary District of Greater Chicago, Ill.
Agricultural Benefits and Environmental Changes Resulting from the Use of Digested Sewage Sludge on Field Crops
Interim rept.
T. D. Hinesly, O. C. Braids, and J. E. Molina. 1971, 73p
Grant G06-EC-00080
Prepared in cooperation with Illinois Univ., Urbana.
Paper copy available from GPO as EP3.2:AG8.

Keywords: Sludge disposal, *Irrigation, Fertilizing, Plant growth, Performance evaluation, Lysimeters, Farm crops, Trace elements, Soil chemistry, Nutrients, *Sewage disposal, Sewage irrigation, Liquid waste disposal.

The project studied involved the possible agricultural benefits and environmental changes that would result from applying digested sewage sludge liquid to field crops. In addition, criteria are developed that can be used in selecting sites for this method of sludge disposal. The report discusses the progress made after three year's work. Since agronomic field studies require a minimum of three years to integrate seasonal effects with measured parameters, the longer the duration of a field study, the greater the confidence level of the results. Therefore, only one year of data--detailed climatic measurements, runoff and drain water analyses, and sludge applications--were collected from a lysimeter facility.

PB-213 594/6 PC **A05**/MF **A01**
Texas A and M Univ., College Station.
Development of a Scientific Basis for the Manufacture of Low-Cost Protein Foods and Beverages from Fresh Coconuts
Final rept.
Karl F. Mattil. 1 Sep 70, 77p* TA/OST-AN-70-9-3
Contract PIO/T 931-11-190-864, PIO/T-73-3192010

Keywords: Nuts(Fruits), *Proteins, Food processing, Fruits, Nutritive value, Developing countries, *Food Products, *Coconuts.

Coconuts represent a potential new indigenous protein source in the coconut producing countries of the world. This report provides the results of an effort to generate fundamental scientific and technological information basic to the practical exploitation of this protein source, and to evaluate the state of the art of processing fresh coconuts for food use. The evaluation is based on both a survey of the literature and personal contacts with those involved with research and development efforts. Results of basic investigations in the following areas are reported: The ultrastructure of coconut meats; physical processing methods for maximum extraction of fat and protein; the amount of heat treatment coconut meat and meal can tolerate without adverse effects on product quality; identification of major classes of protein in coconut meats; characteristics of each class of protein.

PB-213 612/5 PC **A17**/MF **A01**
Department of Health, Education and Welfare, Washington, DC.
A Selected Bibliography on African Foods and Nutrition. Arranged According to Subject Matter and Area
Woot-Tsuen Wu Leung, and Ritva Rauanheimo Butrum. Dec 70, 391p* TA/OST-AN-70-12-5
Prepared in cooperation with Food and Agriculture Organization of the United Nations, Rome (Italy).

Keywords: Food, *Africa, Developing countries, Nutrition, Bibliographies, Human nutrition, Plants(Botany), Diets, Food composition, Food habits, Food industry, Education, *Food products, African foods.

The bibliography is comprised of references to the world's literature, published in the 1940-1969 time period, dealing with the subject of food and nutrition in Africa. The entries are arranged by country and, within each country, according to general subject (general studies, food resources, food composition, food supplements, food technology, food habits, nutrition and dietary surveys, nutritional status, and nutrition education). A selected bibligraphy on African botanical nomenclature is appended.

PB-213 756/5 PC **A10**/MF **A01**
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Improving the Nutritive Value of Cereal Based Foods
Annual progress rept. no. 3, Jan-Dec 70.
Jun 71, 217p TA/OST-AN-71-6-5
Contract AID/csd-1586

Keywords: Cereal products, Nutritive value, Food processing, Developing countries, Proteins, Soybeans, Peas, Beans, Flours(Food), Bread, Evaluation, Nutrition, *Pakistan, *Africa, *Food products, *Food fortification, Organoleptic evaluation.

The document describes the activities and accomplishments of an ongoing project which has as its overall objective the improvement of the nutritional value of cereal-based food in North Africa and Pakistan by supplementation and process modification without decreasing the food acceptability to the general consuming public in those areas. Research effort focused on the use of three protein sources: soy flour, chick-pea flour, and horse bean flour. These were used for food fortification. Emphasis was given to the nutritional and organoleptic evaluations of chapatis, couscous, and Moroccan bread fortified with the high protein flours. (Author)

PB-213 758/3 PC **A06**/MF **A01**
New York State Agricultural Experiment Station, Geneva.
Development of Soy-Based Foods of High Nutritive Value for Use in the Philippines
W. B. Robinson, M. C. Bourne, and K. H. Steinkraus. Jan 71, 106p TA/OST-AN-71-1-2
Contract AID/csd-1815

Keywords: *Soybeans, Food processing, Food, *Philippines, Nutritive value, Proteins, Flavor, Economic analysis, Developing countries, *Food products.

Results are given of a research program which was undertaken to develop processes for manufacturing soy-based foods on a scale and of a simplicity appropriate to the socio-economic requirements of relatively small population centers in countries such as the Philippines. Flavor, acceptability, economy, and nutritional value were of primary concern. The report describes research conducted in the following areas: Development of a simple procedure for manufacture of a bland soy beverage and other products that could be easily produced without the use of elaborate and expensive equipment; introduction of the soy beverage to selected groups of Philippine school children; engineering studies on unit operations in soy product manufacturing; nutritional evaluation of the products and the nutritional effects of the unit processes involved; basic laboratory research on physical and chemical qualities of soy products and components to lay a scientific basis for improvement of the products and unit processes involved in their manufacture.

PB-213 764/5 PC A06/MF A01
Agency for International Development, Washington, DC. Office of Nutrition.
Improving the Nutrient Quality for Cereals. Report of Workshop on Breeding and Fortification. Held at Annapolis, Maryland, 7-9 December 1970
Jun 71, 107p TA/OST-AN-71-6-6

Keywords: Grains(Foods), Developing countries, Cereal products, Food processing, Meetings, Plant genetics, Quality, Human nutrition, *Food products, *Food fortification.

There is a great potential for effecting improvement in diet through the breeding of higher protein content and quality in staples and through fortification of such staples during the milling process. The report presents papers from a Seminar on Breeding and Fortification held at Annapolis, Maryland from December 7-9, 1970. The papers concern progress, problems and potential for the improvement of various crops, including wheat, rice, corn, sorghum and millet. Recommendations are given for future operations and research.

PB-213 766/3 PC A02/MF A01
League for International Food Education, Washington, DC.
The Food Industry in Asia, Its Potential for Providing Low Cost Nutritious Foods. Proceedings of Singapore Workshop, 1-5 November 1971
Summary rept.
Nov 71, 24p TA/OST-AN-71-11-2

Keywords: Food industry, *Asia, Developing countries, Economic development, Human nutrition, Cost factors, Food processing, Meetings, *Food products.

The Singapore Workshop was convened to provide a forum where Asian private food industry businessmen could discuss the potential of the food industry for providing low cost nutritious foods. This report summarizes the discussions of these businessmen during the week-long meeting. Special emphasis is given to the constraints which were identified as being the ones which hinder the progress of low-cost nutritious foods. Equivalent emphasis is also given to the recommendations for action which the participants felt could help overcome these constraints.

PB-213 769/0 PC A03/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Improving the Nutritive Value of Cereal Based Foods
Annual progress rept. no. 4, Jan-Dec 71.
1 Jun 72, 37p TA/OST-AN-72-6-1
Contract AID-csd-1586

Keywords: Cereal products, Nutritive value, Food processing, Developing countries, Proteins, Soybeans, Peas, Flours(Food), Bread, Evaluation, Nutrition, Pakistan, Africa, *Food products, *Food fortification, Organoleptic evaluation, Protein fortified foods.

A review is presented of research to improve the nutritional value of cereal based foods in North Africa and Pakistan by supplementation and process modification without decreasing the food acceptability to the consumers in those areas. The foods considered were protein fortified wheat based bread, chapatis, and couscous using soy flour, chickpea flour, and broadbean flour. The fortified foods met the nutritive guidelines established by the project and prove acceptable to small consumer panels. Many other protein resource materials were evaluated. A system of developing and evaluating protein fortified foods was evolved. (Author)

PB-213 787/8 PC A04/MF A01
Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.
Extending Protein Concentrates for Child Feeding by Addition of Inexpensive Simple Nitrogen Sources
Final rept.
Nevin S. Scrimshaw. Oct 71, 63p TA/OST-AN-71-10-5
Contract AID/csd-1441

Keywords: Food additives, *Nitrogen, Food additives, *Milk, Proteins, Amino acids, Nutrition, *Children, *Food fortification.

A series of studies has been undertaken to determine the extent to which the concentration of essential amino acids in dried milk can be extended by the addition of non-specific nitrogen without influencing the nutritional value of the protein. The results of the studies, which were conducted in children and young men, are summarized in this report. The non-specific nitrogen source used was a mixture of glycine and diammonium citrate. The results support the conclusion that at any time that it is necessary to extend the 'protein' content of milk supplies for the supplementary feeding of population groups, inexpensive non-specific nitrogen sources may be used to an extent of at least 10% without impairing the ability of the milk to meet any normal protein needs.

PB-213 794/9 PC A14/MF A01
Kasetsart Univ., Bangkok (Thailand). Inst. of Food Research and Product Development.
Report on Protein Food Development Project, 1969-1971
Amara Bhumiratana, and Amorn Nondasuta. 1971, 302p TA/OST-AN-71-13-2
Prepared in cooperation with the Health Dept., Bangkok (Thailand). Nutrition Div. Text in English and Thai.

Keywords: *Proteins, *Food processing, Nutrition, Children, Diets, Developing countries, *Thailand.

The document reports the activities and accomplishments of a project which was instituted to improve the nutritional conditions in Thailand. The principal objectives were: To promote development in food technology and related fields; to develop high-protein food supplements for infants and preschool children; to test new products for suitability and acceptability by consumers; and to promote new products on a commercial scale in an effort to increase consumption among the people. The information provided includes: The results of field trials of protein food prototypes; chemical and biological assays; flowcharts for the production of various protein foods; protein food promotion efforts; protein-enriched menus for school children, including recipes for their preparation.

PB-214 120/8 PC A02/MF A01
Delaware Univ., Newark. Water Resources Center.
Water Use Efficiency of Vegetable Crops Given over Asphalt Moisture Barriers
Technical research project completion rept.
Ernest N. Scarborough, and William C. Liebhardt.
Dec 72, 15p W73-03907
Contract DI-14-31-0001-3008, DI-14-31-0001-3208
Sponsored in part by Research contract DI-14-31-0001-3508.

Keywords: Soil moisture, Barrier materials, Water consumption, Vegetable crops, *Asphalt, Efficiency, Nitrogen inorganic compounds, Sands, Leaching, Yield, Productivity, Rainfall, Delaware, *Soils, *Vegetables, Asphalt moisture barriers, *Water use.

The effectiveness of a subsurface asphalt moisture barrier in increasing yields of vegetable crops grown on loamy sand soils was investigated. Six vegetable crops were grown under conditions of irrigation and no irrigation with and without a barrier. Average yield increases of all crops over the barrier without irrigation were 46%, 58% and 55% for 1967, 1968 and 1969 respectively. With irrigation, yield increases were 35%, 16% and 30% for 1967, 1968 and 1969. Yield increases were due to a combination of increased water retention and a reduction in nitrate leaching due to excessive rainfall. The barrier increased the water holding capacity of the soil in top 2 feet by approximately 1.25 inches or an additional 70% in available water. In laboratory leaching studies with simulated barriers using high rates of nitrogen, 2 1/2 times as much nitrate remained in the top 2 feet of the soil compared to no barrier with a 5 inch application of water. A summary of yields by crop and graphs of the movement of nitrate, ammonium and potassium are included. The asphalt moisture barrier has proven to be an effective production practice with sandy soils where irrigation is not feasible. (Author)

PB-214 172/9 PC A14/MF A01
Arizona Univ., Tucson. Inst. of Arid Lands Research.
Salinity Problems in Arid Lands Irrigation: A Literature Review and Selected Bibliography
Information paper no. 1
Hugh E. Casey. 1972, 311p* WRSIC-73-300
Grant DI-14-01-0001-1616

Keywords: Bibliographies, *Arid land, *Irrigation, Salinity, *Water quality, Land reclamation, Drainage, Watersheds, Leaching, Water rights, Soil moisture, Droughts, Salt water, Greenhouses, Reviews, Irrigated land, Colorado River Basin.

A bibliography of 986 references with accompanying text that reviews broadly such topics as water quality and the total drainage basin, salinity prevention and soil reclamation, salinity and drought effects on plants, soil and water salts, basic water balance problems in relation to irrigation, plus a perspective on historic salinity problems and an overview. Socioeconomic aspects are considered, with reference to the Colorado River basin as an example in microcosm. There is discussion of currently used and potential ameliorative techniques that would render current methods more efficient, raise productivity enough to constitute a breakthrough, and high-humidity low water-use greenhouse structures that would radically alter current arid lands irrigation methods. (Author)

PB-214 173/7 MF A01
Council on Environmental Quality, Washington, DC.
Integrated Pest Management
Nov 72, 51p
Paper copy available from GPO as stock no. 411-0010.

Keywords: Agriculture, *Pest control, Pesticides, Ecology, Genetics, Plants(Botany), Breeding, Microbiology, Parasitology, Biological pest control.

A detailed description of the integrated pest management approach, its stage of development, and the federal effort being initiated to promote its further development and use. It is the result of a CEQ study to define positive approaches in alleviating the problems now being encountered with some agricultural pest control practices.

PB-214 175/2 PC A05/MF A01
Self-Help Enterprises, Inc., Visalia, Calif.
The Bravo Story
Final rept.
Robert Marshall. 1 Mar 72, 88p*
Grant HUD-H-1451

Keywords: Regional planning, California, Residential buildings, Social welfare, Construction, Concepts, Legislation, Urban planning, Methodology, Services, Manpower utilization, Specialized training, Financing, *Socioeconomic status, Bravo Industries, San Joaquin Valley, Low cost housing, Self help housing, Disadvantaged groups, Migrant workers, Seasonal farm workers.

Bravo Industries is the story of a concept and of the effort made by Self-Help Enterprises, Inc. (SHE) to fulfill its basic mandate of assisting migrant and seasonal farmworkers and their families to improve their living conditions and develop the necessary skills to maintain a productive and self-sufficient life. Bravo is also the story of an organizational structure designed to develop new techniques and methods for meeting the immediate and pressing needs of predominantly farmworkers families for improved housing and sanitation in the face of changing demands in agricultural employment.

PB-214 271/9 PC A02/MF A01
Card Corp., Denver, CO.
Waste Glass as a Flux for Brick Clays
Research rept. 1971-72
M. E. Tyrrell, and Alan H. Goode. Dec 72, 14p* Rept no. BuMines-RI-7701
Prepared in cooperation with Tuscaloosa Metallurgy Research Lab., University, Ala.

Keywords: *Bricks, *Glass, *Clays, Fluxes, Wastes, Manufacturing, Firing, Production engineering, Structural clay products, Sizing materials, Utilization, Waste disposal, *Waste recycling, Solid waste disposal.

The investigation was undertaken to demonstrate how waste glass might be used to lower the required firing temperature and firing time of structural clay products. Mixtures of waste glass and common clays were formed by stiff-mud extrusion and fired to the temperature required to produce a body having 6-7 percent absorption. Substitution of glass for one-half the clay in a red body reduced the firing temperature 500F, making a 30 percent increase in production possible; in a tan body the firing temperature was reduced 400F making a 23.3 percent increase in production possible. (Author)

PB-214 489/7 PC A05/MF A01
International Society for Rehabilitation of the Disabled, New York.
Closing the Communications Gap. The Role and Functions of Information Media in Rehabilitation Services
Final rept. 1967-69
Charles Kalisky. 1971, 99p SRS-RD-2297
Grant SRS-RD-2297

Keywords: *Rehabilitation, Information systems, Periodicals, Effectiveness, Communications management, Handicapped workers, Project planning, Organizations, Improvement, International relations, Reviews, Manpower utilization, Services, Developing countries Methodology, Bibliographies, *Information services, Disabled persons.

The final report of the International Rehabilitation Program Development Project determines ways and means of improving information services for those working with the handicapped all over the world. Specifically, the project has demonstrated the value of a periodical published in the major languages to disseminate news and significant developments in the field. A number of novel services were initiated, including a series of papers and reports on advanced techniques and methods designed to assist workers in developing countries; a bibliography of available material on rehabilitation in several languages; an international library of films and slides to aid in training personnel; a multilingual glossary of rehaviliation terms; and a Research Referral Service to act as a clearinghouse for current information. (Author)

PB-214 508/4 PC A03/MF A01
Illinois State Water Survey Div., Champaign.
Nonpoint Rural Sources of Water Pollution
Shundar Lin. 1972, 40p* Rept no. ISWS-73-CIR1111
Prepared in cooperation with Illinois State Dept. of Registration and Education.

Keywords: Surface water runoff, *Water pollution, Rural areas, Nutrients, Agricultural wastes, Reviews, Fertilizers, Nitrogen, Phosphorus, Illinois, Soil erosion, Sources, Livestock, Industrial waste treatment, Pesticides, Subsurface drainage, Feedlot wastes, Manure, Water pollution control.

A literature survey was made to gather information for defining the quantity and characteristics of nonpoint water pollution sources from rural areas. Major constituents of such pollution include fertilizers, pesticides, erosion and sediment, and animal wastes. Studies showed that nitrogen and phosphorus from surface runoff and subsurface drainage are often greater in concentration than that from sewage effluents. Pesticides are only slightly soluble in water, and about 5 percent of that applied may enter waterways through surface runoff and erosion. With the exception of sediment transport, farm animal wastes can be the most serious sources of pollution from farm lands. Control techniques are discussed.

PB-214 534/0 PC A03/MF A01
Joint Study Group on Agricultural Engineering in Brazil.
Study for Agricultural Engineering Development in Brazil
Rept. for 24 Jul-12 Aug 72.
12 Aug 72, 43p TA/OST-NAS-72-39
Contract AID/csd-1122
Report of the Joint Study Group on Agricultural Engineering in Brazil US--Brazil Science Cooperation Program.

Keywords: Agricultural engineering, *Education, *Brazil, Research, Policies, Recommendations, Food industry, Professional personnel, Awareness, Developing countries, *Agriculture.

The joint study group was established to identify the most urgent research and training needs in agricultural engineering in Brazil, and to recommend how best to meet those needs. Specific recommendations are given for a long-term program to establish quality programs in education and research in agricultural engineering in Brazil and means to gain recognition for agricultural engineering as a profession under Brazilian law. (Author)

PB-214 862/5 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
RANN (Research Applied to National Needs) Program: Potential Benefits to Developing Countries
Jan 73, 48p Rept no. TA/OST-73-16

Keywords: Developing countries, Impact, Project planning, Benefit cost analysis, Resources, Information systems, Disasters, Energy, Urban planning, Environmental engineering, Water pollution, Sociometrics, Community development, Services, *Technology transfer, Spinoffs, Technological development, RANN program.

RANN stands for Research Applied to National Needs -- an expanding program of the National Science Foundation designed to stimulate the harnessing of science in the service of man. This report identified 48 individual RANN projects that could have special relevance to the needs of developing countries. It clarifies their technical significance to these countries and illustrates possible types of spin-off benefits. No attempt is made to identify how a specific research project might benefit a particular developing country. Rather, the attempt here is to indicate in a general way the nature of the potential benefit to developing economies within the context of technology transfer.

PB-214 870/8 PC A09/MF A01
California Inst. of Tech., Pasadena.
100 Problems in Environmental Health.
W. L. Faith, Jack E. McKee, H. Heukelekian, Thomas F. Mancuso, and Emil M. Mrak. 1961, 198p
Grant PHS-RG-7263

Keywords: Public health, Pollution, *Air pollution, *Water pollution, Industrial medicine, Food industry, Water supply, *Waste disposal, *Health, Solid waste disposal.

Contents:
- Air pollution;
- Food science and technology;
- Occupational health;
- Water supply and water pollution;
- Solid waste disposal and miscellaneous.

PB-214 984/7 PC A03/MF A01
Public Health Service, Washington, DC.
Refuse Collection and Disposal for the Small Community.
William A. Xanten, and Ralph J. Van Derwerker. Nov 53, 46p
Prepared in cooperation with the American Public Works Association, Chicago, Ill.

Keywords: Communities, *Waste disposal, Planning, Solid waste disposal.

Surveys have shown that many small communities do not follow sanitary refuse practices. There are many reasons why these communities have not taken steps to protect the health and welfare of their citizens. Predominant among the basic causes, however, is the belief that adequate service is too expensive, and a lack of information on how to establish and operate a satisfactory system. It has been clearly demonstrated many times, that urban fly control and rodent control must be based upon adequate storage, collection, and disposal of community wastes. A practical refuse control program is within the means of any community. This publication proposes to describe certain factors which needs to be considered in establishing sanitary refuse practices, and to present representative operational and cost data in such manner that they may be interpreted to meet local conditions.

PB-215 103/3 PC A02/MF A01
Field Information Agency, Technical.
Materials, Techniques, and Testing Methods for the Sanitation (Bacterial Decontamination) of Small-Scale Water Supplies in the Field Used in Germany During and after the War.
Final rept.
Alexander Goetz. 8 Dec 47, 10p Rept no. FIAT-1313

Keywords: *Sewage treatment, Military operations.

The report presents results obtained from investigations of the nature and methods for water purification used in Germany during and following the second world war.

PB-215 149/6 PC A04/MF A01
Agency for International Development, Washington, DC.
Techniques for Assessing Hydrological Potentials in Developing Countries (State of the Art and Research Priorities)
Jan 73, 74p TA/OST-73-17
See also PB-207 192.

Keywords: *Water resources, Developing countries, *Hydrology, Research, Stream flow, Soil erosion, Ground water, Sediment transport, Remote sensing, Probes, Soil water.

The report describes current capabilities and future needs for assessing hydrological potentials under the following topical headings: stream flow, erosion and sediment transport, water movement in unsaturated soils, ground water, precipitation, evaporation, and hydrologic applications of remote sensing. Established techniques and methodologies are described under 'State of the Art', while the most interesting emerging areas for attention by developing countries and foreign assistance agencies are presented under sub-topics entitled 'Current Research' and 'Research Opportunities for Application in Developing Countries.' The report is based in part on a preliminary analysis prepared by the U.S. Geological Survey, 'Techniques for Assessing Water Resource Potentials in the Developing Countries,' Open File Report, December 1971. (Author)

PB-215 282/5 PC A02/MF A01
Environmental Protection Agency, Cincinnati, Ohio. Solid Waste Management Office.
Residential Solid Waste Generated in Low-Income Areas
Samuel Hale, Jr. 1972, 17p Rept no. EPA-SW-83TS

Keywords: *Waste disposal, Socioeconomic status, Urban areas, Distribution(Property), Characteristics, Trends, Residential buildings, Economically depressed areas, Disadvantaged groups, Low income groups, Poverty areas, Solid waste disposal.

Variations inherent in the generation of solid wastes make it extremely difficult to predict quantities that can be expected from a dwelling within a residential neighborhood. Some possibly influencing factors are climate, season, socioeconomic level, and dweller density. The objective of the study was to examine the quantities and critical factors involved in the generation of solid wastes in low-income residential neighborhoods. The results are presented in order that a better understanding of waste quantities and characteristics may be obtained. (Author)

PB-216 240/2 PC A06/MF A01
National Center for Urban and Industrial Health, Cincinnati, Ohio.
Manual of Septic-Tank Practice.
1967, 101p Rept no. PHS-Pub-526
Prepared in cooperation with the Joint Committee on Rural Sanitation. Revision of report dated 1957 and reprinted 1963.

Keywords: *Septic tanks, Reviews, Design, Handbooks, *Sewage disposal.

Contents:
Septic tank - soil absorption systems for private residences;
Septic tank - soil absorption systems for institutions, recreational areas, and other establishments.

PB-216 556/1 PC A03/MF A01
New Mexico State Univ., Las Cruces. Engineering Experiment Station.
Controlling Factors in Methane Fermentation.
Summary of research progress rept. 1 Sep 62 - 1 Sep 64
R. E. Speece, and R. S. Engelbrecht. 1964, 46p
Grant FWPCA-WP-00394

Keywords: Anaerobic processes, Process variables, *Sewage treatment, Fermentation, Metabolism, Nutrients, Digestion(Decomposition), *Methane, *Bioconversion, Methane bacteria.

A number of approaches have been taken in attempting to evaluate the important factors which control the rate of methane fermentation in anaerobic digestion. The ultimate goal of the research has been to determine the chemical, physical, and biochemical requirements which will enable the methane fermentation to proceed at rates on the order of one magnitude greater that commonly observed in conventional anaerobic digestion. A considerably detailed study was conducted to assay the methane fermentation stimulation potential of six compounds which had shown promise in a previous study conducted by the principal investigator. Next, a series of studies was designed to evaluate the influence of many physical and chemical factors involved in digestion. Following this, the methane fermentation requirements for trace organics, such as vitamins and amino acids was studied. Combinations of individual amino acids and vitamins as well as mixtures, e.g. case in hydrolyzate (enzymatic), yeast extract, and fortified vitamin B complex, were assayed for their stimulation potential. The surface charge on the microorganisms was altered by inorganic and organic coagulating agents while observing the acetate utilization rate.

PB-217 117/1 PC A06/MF A01
National Academy of Sciences, Washington, DC.
Regional Workshop on Water Resources, Environment, and National Development. Volume I. Summary of Proceedings. Singapore, March 13-17, 1972
Mar 72, 120p
Contract AID/csd-2584
Prepared in cooperation with the Science Council of Singapore.

Keywords: *Water pollution, *Southeast Asia, Developing countries, *Water resources, Southeast Asia, Meetings, Water quality, Sewage treatment, Industrial wastes, Water supply, Population growth, Singapore, Pesticides, Regional planning, Oil pollution, Eutrophication, Solid waste disposal, Water pollution abatement.

The report contains the summary of proceedings of a workshop organised under the joint sponsorship of the Science Council of Singapore and the National Academy of Sciences of the U.S.A. Its main purpose was to focus attention on current problems of water resources and the environment faced by countries of the Southeast Asian region, and stimulate regional cooperation in seeking solutions.

PB-217 118/9 PC A03/MF A01
National Academy of Sciences, Washington, DC.
Workshop on Industrial and Technological Research, Djakarta, Indonesia. Volume 1
Jan 71, 38p
Contract AID/csd-2584
Prepared in cooperation with Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia), Djakarta. See also PB-218 724.

Keywords: Economic development, *Indonesia, Developing countries, Industries, Education, Meetings, Problem solving, Shortages, Policies, Planning, Financing, Reviews, *Research and development, *Industrial development, Workshops, Technological development.

Overall findings and recommendations of the Workshop are presented. The concern of the Workshop was the strategy for using research, development, and engineering to assist in achieving the desired industrial growth in Indonesia. Problem areas discussed include shortages in trained manpower, laboratory facilities, equipment and supporting services, national science policy, funding level, and need for science planning and coordination at the national level.

PB-217 119/7 PC A12/MF A01
National Academy of Sciences, Washington, DC.
Conservacion del Medio Ambiente Fisico y el Desarrollo (Environment and Development)
Jul 71, 254p
Contract AID/csd-2584
Text in Spanish. Summary in English. Primer Seminario Centroamericano Sobre el Medio Ambiente Fisico y el Desarrollo, Antigua, Guatemala, 25-30 Jul 71. See also report dated Jul 71, PB-211 487.

Keywords: Economic development, *Central America, Environment, Developing countries, Meetings, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Agriculture, Industries, Forestry, Services, Regional planning, Education, Pesticides, Water resources, *Environmental impacts, AID.

In developing regions like Central America there are appearing signs, sometimes alarming, of environmental contamination and degradation of natural resources. The first Central American Workshop on Development and the Environment examines in depth the regional environmental problems, and provides the planning directors and governmental officials with the necessary criteria for incorporating environmental aspects into their development programmes. The focus of the Workshop was on the industrial, agricultural, and service industry sectors. Included in the report are background papers and the recommendations of the Workshop.

PB-217 142/9 PC A04/MF A01
Robert A. Taft Sanitary Engineering Center, Cincinnati, OH.
Engineering Studies of Coffee Mill Wastes in El Salvador, C. A., October 18-November 9, 1960.
Hayse H.. Black. Apr 61, 57p
Report to International Cooperation Administration, United States of America Operations Mission to El Salvador.

Keywords: *El Salvador, *Water pollution, *Food processing, Industrial waste treatment, *Industrial wastes, Coffee processing, Water pollution control, EPAL.

The report pertains to control and treatment of both solid and liquid wastes from processing coffee in El Salvador. Included are: Notes on conferences and observations pertaining to wastes from processing coffee in El Salvador during the period October 18 to November 9, 1960; Review of technical literature dealing with control and treatment of liquid wastes resulting from the processing of coffee; and Future research on coffee wastes.

PB-217 276/5 PC A02/MF A01
Robert A. Taft Sanitary Engineering Center, Cincinnati, OH.
Septic Tank Design Economic Factors Involved.
James B. Coulter. 1955, 20p
Presented at the Home Sewage Disposal Training Conference at Michigan State College, East Lansing, Mich., 11 Jan 55.

Keywords: *Septic tanks, Design, *Sewage disposal.

In light of present knowledge, the idea should be discarded that there is a single best design for a septic tank. Acceptable performance can be obtained with a wide range of freedom in design. The report reviews the current design status.

PB-217 293/0 PC A05/MF A01
National Academy of Sciences, Washington, DC.
A Report on the LIPI-NAS Workship on Natural Resources. Volume I. Overall Findings and Recommendations-Working Group Reports
1972, 81p
Contract AID/csd-2584
Prepared for Workshop on Natural Resources, held in Jakarta (Indonesia) 11-16 Sep 72. Prepared in cooperation with Indonesian Institute of Science (Lembaga Ilmu Pengetahuan Indonesia), Djakarta.

Keywords: Economic development, *Natural resources, *Indonesia, Developing countries, Land, Soils, Forestry, Water resources, Oceans, Mineral deposits, Policies, Recommendations, Meetings.

The purpose of the Workshop was to formulate recommendations on how to utilize the natural resources of Indonesia in a manner consistent with the needs and rising expectations of a growing population. Specific objectives were: (1) to suggest policies and procedures for strengthening the integrated planning and utilization of natural resources; (2) to suggest scientific and technological inputs; and (3) to provide a form for a coordinated and constructive exchange of views by key scientists, policy-makers, and administrators. Part I of the Report considers problems and major recommendations. Sectoral recommendations are given in Part II. (Author)

PB-217 667/5 PC A09/MF A01
Harvard Univ., Cambridge, MA. Div. of Engineering and Applied Physics.
Operations Research in Water Quality Management.
Final rept.
Harold A. Thomas, Jr, and Robert P. Burden. 15 Feb 63, 179p
Contract PH-86-62-140

Keywords: *River basin development, Mathematical models, Water resources, Operations research, Stream flow, Sewage treatment, Economic development, *Water quality, *Waste water.

New methods are reported for evaluating the composite effects of combinations of streamflow regulation, waste water treatment, and waste water regulation for application in comprehensive programs to improve and maintain the quality for water in major water resources systems. The objective is to show how these methods may be used to strengthen the rational base for river basin planning by use of mathematical systems analysis.

PB-217 790/5 PC A02/MF A01
Robert A. Taft Sanitary Engineering Center, Cincinnati, OH.
Treatment of Wastes from Coffee Processing in Costa Rica.
Herbert R. Pahren, and Rudolfo F. Saenz. 1960, 19p
Rept no. SEC-TR-W60-2

Keywords: Food processing, Industrial waste treatment, *Costa Rica, *Waste treatment, *Water pollution, Water pollution control, *Coffee.

To determine the feasibility of the treatment of these wastes in stabilization ponds in the country of Costa Rica, a preliminary study was made to learn more about the characteristics of the coffee wastes. Tentative calculations were then made concerning the size of stabilization ponds necessary for these wastes. A brief outline of the information collected is summarized.

PB-218 226/9 PC A05/MF A01
Public Health Service, Washington, DC. Div. of Sanitary Engineering Services.
Manual of Septic-Tank Practice. Developed in Cooperation with the Joint Committee on Rural Sanitation.
1 Aug 59, 96p Rept no. PHS-Pub-526
Addendum to part I inserted.

Keywords: *Septic tanks, Manuals, *Sewage disposal.

The Manual on septic tank practices has been prepared for use as a guide by health agencies, building officials, installers, and others, to meet the need for an authoritative treatise on the subject.

PB-218 232/7 PC A06/MF A01
Foreign Economic Development Service, Washington, DC.

Planning Korea's Agricultural Development. Analyses and Recommendations for the Third Five Year Plan
William R. Gasser, James P. Cavin, Richard S. Magleby, Edward S. Micka, and Troy Mullins. Aug 70, 110p FEDS-Field-5, TA/OST-AN-70-8-2

Keywords: *Agricultural economics, *South Korea, Economic development, Livestock, Grains(Food), Marketing, Income, Planning, Demand(Economics), South Korea.

The population of the Republic of Korea is expected to exceed 35 million by 1976, a gain of about 13% over the 1969 figure. In the same period, the Gross National Product in real terms is projected to increase more than 80%, with income per capita showing a gain of about 78%. This population and income growth will generate a rapid rise in the demand for food, requiring an expansion of 25% to 30% in the total supply of farm products. This report contains a series of recommendations concerning steps that may be taken to effect this expansion in the areas of agricultural production and marketing. Consideration is given to the general improvement of long-range projections, livestock improvement plans, problems relating to grains, evaluation of marketing needs, and proposed reorganization for economic research. (Author)

PB-218 338/2 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
A Deflection Survey Technique for Pavement Evaluation in Developing Countries
H. R. Smith. 1973, 40p Rept no. TRRL-LR-525

Keywords: Flexible pavements, Deflection, Highways, Developing countries, Tropical regions, Design, Surveys, Evaluation, Covering, Test methods, *Malaysia, *Zambia, Great Britain, *Roads, *Pavements.

The role of deflection beam surveys in the evaluation of flexible pavements is discussed. Deflection studies in Malaysia and Zambia are described from which a suitable survey method for use on tropical roads, for the purpose of designing strengthening overlays or pavement reconstruction, has been developed. Testing at 100m intervals in both wheel-tracks is recommended with provision for a higher density of testing if the road deflection is variable, if the road surface has areas of visible distress, or if there are occasional very high deflection values. Deflection values of roads tend to exhibit skewed distributions but it is concluded that this is not necessarily a significant factor from the point of view of survey analysis for practical overlay design. (Author)

PB-218 631/5 PC A04/MF A01
Texas A and M Univ., College Station. Water Resources Inst.
An Investigation of Hydrological Aspects of Water Harvesting
Research project completion rept. 1 Jul 69-31 Aug 72
Otto Wilke, Jack Runkles, and Charles Wendt. Sep 72, 65p TR-46, OWRR-B-071-TEX(2)
Contract DI-14-31-0001-3132

Keywords: Catch basins, Surface water runoff, *Water supply, *Arid land, Playas, Lakes, Erosion control, Crude oil, Precipitation(Meteorology), Slopes, Cost estimates, Economic analysis, Simulation, Mathematical models, Texas, *Hydrology, Lubbock(Texas), Amarillo(Texas), Texas High Plains.

Water harvesting is a potential source of water for arid and semi-arid lands. The objectives were to determine combinations of land surface treatments and land forming which result in efficient but inexpensive water harvesting catchments and to determine the optimum shape of catchments. In laboratory studies with inexpensive materials, crude oils exhibited the best sealing properties. However, by six months after application, 750 gal per ac of crude oil has no apparent effect on runoff from field plots. Water harvesting catchments constructed by grading the soil to form V-shaped valleys and then compacting the surface yielded runoff equal to 31 to 43 percent of all precipitation. After rains, sand blown from such catchments may damage tender downwind vegetation. Some water erosion occurred, but, after two years, the basic shape and the performance of the catchments had not been damaged by erosion. Chemical weed control is recommended. (Author Modified Abstract)

PB-218 990/0 PC A04/MF A01
Denver Regional Council of Governments, Colo.
Recycling Activity Description: Transfer, Intermediate Storage, Processing, Recycling
Final rept.
May 72, 56p* Rept no. DRCOG-72-013
Contract HUD-H-1392
Prepared in cooperation with Urban Drainage and Flood Control District, Denver, Colo.

Keywords: Waste disposal, Colorado, Regional planning, Materials recovery, Storage, Trends, Forecasting, Management planning, Waste transfer stations, *Waste recycling, Solid waste disposal, Denver(Colorado), Reuse project.

The report includes a description of the four functions relating most directly to solid waste recycling, reuse, or resource recovery, including transfer, intermediate storage, processing, and recycling. The Denver, Colorado area was used for the study. The present situation is also summarized, and long-range trends for each function are forecast. Recent and current citizens group and industry activity in recycling programs is described. As a basis for improving the existing situation as described, a number of technical and management concepts are presented in relation to their current and future feasibility, possible date of availability, or the form of management action required to implement them. (Author Modified Abstract)

PB-219 683/0 PC A10/MF A01
North Carolina State Univ., Raleigh. Dept. of Economics.
A Generalized Crop-Fertilizer Production Function. (631.88-R988).
Doctoral thesis
James Garrett Ryan. 1972, 211p AID-631.88-R988
Contract AID/csd-2806

Keywords. Farm crops, Soil fertility, *Fertilizers, Agricultural economics, *Peru, Potatoes, Production capacity, Recommendations, Nitrogen, Phosphorus, Potassium, Theses, *Soils, *Crops, Production functions.

The problem examined in this study is the derivation of a generalized crop-fertilizer production function describing the response relation between measured soil characteristics, applied nutrients, weather and crop yield. It is hypothesized the function can be used to generate specific fertilizer recommendations to farmers based on soil analysis. The data come from potato-fertilizer experiments conducted on 65 farm locations over a seven year period in the Sierra Region of Peru. A quadratic model was chosen as the most appropriate form to describe the response relationships in these data. (Author Modified Abstract)

PB-219 684/8 PC A02/MF A01
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Is Inexpensive Credit a Bargain for Small Farmers: The Recent Brazil Experience. (Br-332.71-A211a).
Occasional paper
Dale W. Adams, Harlan Davis, and Lee Bettis. Jan 72, 16p Occasional Paper-58, AID-BR-332.71-A211a
Contract AID/csd-2501
Report on 'Studies in Agricultural Capital and Technology.'

Keywords: *Agricultural economics, Developing countries, Credit, Economic analysis, *Brazil, Banking business, Policies, Problem solving, Recommendations, Small farmers.

The authors discuss major credit distribution problems on the supply side of credit in Brazil as they affect the problem of extending credit to small farmers. They suggest that adjustments in current policies might substantially increase the flow of credit to small farmers through regular banking channels. Information from Brazil is used to illustrate the contention. The following topics are considered: background on agricultural credit in Brazil; interest rate policy; institutional agricultural credit; results from credit and interest rate policies; reasons for loan concentrations; conclusions; and policy recommendations. (Author Modified Abstract)

PB-219 685/5 PC A03/MF A01
Ohio State Univ., Columbus, Dept. of Agricultural Economics and Rural Sociology.
An Analysis of Shifting Relative Prices and Marketing Facility Investments in the Context of Technological Change in the Developing Countries. (338.13-J65).
Occasional paper
S. S. Johl. Oct 71, 27p Occasional Paper-37, Aid-338.13-J65
Contract AID/csd-2501
Report on 'Studies in Agricultural Capital and Technology'.

Keywords: Agriculture, Developing countries, Marketing, Economic analysis, India, Prices, Production rate, Growth, Grains(Food), Regulations, Incentives, International trade, *Agricultural economics, Imports.

The author states that agricultural production growth of most of the developing countries in the last 3-4 years has very considerably decreased their dependence on imports, especially food grains. This shift from heavy dependence on imports to fast-increasing internal surpluses has created the need for now government regulations governing the control and operation of markets so that the domestic market becomes fully responsive to the production changes and at the same time keeps up the incentives for higher and better production. (Author)

PB-219 688/9 PC A02/MF A01
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
Some Aspects of the Suitability of High Yielding Rice and Bajra Varieties for the Small Farm, Thanjavur and Mehsana Districts, India. (In-633.18-S346).
Rept. for Dec 70-Oct 72
Michael G. G. Schulter, and Richard W. Longhurst. Oct 72, 23p Occasional Paper-57, AID-IN-633.18-S346
Contract AID/csd-2805

Keywords: Rice plants, Farms, Farm management, *India, Yield, Prices, Plant genetics, Cost comparison, Manpower, *Rice, Small farms, Thanjavur District(India), Mehsana District(India), Rice ADT-27, Agricultural development, AIDH.

In order to evaluate farmers' response to the new rice and bajra varieties, the Indian Institute of Management at Ahmedabad undertook an intensive study of two districts--Mehsana District in Gujarat for a study of hybrid bajra, and Thanjavur District in Tamil Nadu, for a study of ADT-27, a new high yielding rice variety. In each district, use of inputs, yields and prices were collected from approximately 60 farmers who had adopted the new varieties of seed on some part of their acreage, and approximately 40 who had grown only the traditional varieties. A regression framework is used to examine factors affecting the extent of adoption of ADT-27 in Thanjavur. This is supplemented by comparative production function analysis of ADT-27 and traditional rice varieties. Hybrid and local bajra are compared, again with production function analysis. Finally, an assessment is made of ADT-27 and hybrid bajra as to their suitability for the small farmer. (Author Modified Abstract)

PB-219 690/5 PC A03/MF A01
Cornell Univ., Ithaca, NY. Dept. of Agronomy.
Organic Phosphorus in Soils with Special Interest in Soils of the Tropics. 631.4-R645.
Rept. for Jun 69-Jan 73
K. J. Roberts, and R. M. Weaver. Jan 73, 34p Agronomy Mimeo-73-1, AID-631.4-R645
Contract AID/csd-2490

Keywords: Soil chemistry, Phosphorus organic compounds, Soil fertility, Tropical regions, Cultivation, Plant growth, Nucleic acids, Lipids, Nitrogen organic compounds, Clay minerals, Weathering, Cation exchanging, Leaching, Extraction, Ignition, *Soils.

It is the purpose of this study to review and summarize the existing knowledge and literature on organic phosphorus in highly weathered soils of the tropics. This review includes many references which are concerned primarily with organic phosphorus as present in soils of temperate regions. This is included to serve as a starting point for investigations in tropical areas. The three major topics covered are: identification and determination of specific forms of organic phosphorus; mineralization of organic phosphorus; and determination of total organic phosphorus. Less attention is given to mi-

crobiological aspects of the problem. Specifically, the author discusses and reviews the following topics: inositol phosphates; phospholipids; nucleic acids; correlation with organic nitrogen and carbon; effects of cultivation and presence of plants; effects of soil organic phosphorus-clay mineral interactions; extraction methods; ignition methods and comparative studies of extraction versus ignition methods. (Author)

PB-219 695/4 PC A03/MF A01
Cornell Univ., Ithaca, NY. Dept. of Agronomy.
Nitrogen Fertilization in the Humid Tropics. (631.8-F793).
Rept. for Jun 69-Nov 72
Richard H. Fox. Nov 72, 27p Agronomy Mimeo-72-17, AID-631.8-F793
Contract AID/csd-2490
Presented at the Tropical Soil Research Seminar, Ibadan, Nigeria, May 1972.

Keywords: *Fertilizers, Nitrogen inorganic compounds, Oil fertility, Tropical regions, Field tests, Corn plants, Grain crops, *Puerto Rico.

In the humid tropics, as in temperate areas, sustained high production of nonleguminous crops can be accomplished only by the addition of N to the soil. Two years ago, field experiments were started in Puerto Rico to determine the most efficient means of supplying N fertilizer to non-leguminous crops. The author discusses the following topics in this research study: the need for and use of N fertilizers; sources of fertilizer N; placement and time of application of fertilizer N; fertilizer N recovery; N-losses; NO3 retention; soil test methods; fertility maintenance; nitrogen fertilization experiments in Puerto Rico; and conclusions. The most salient findings of the N fertilization experiments with corn and sorghum are given. (Author Modified Abstract)

PB-219 696/2 PC A02/MF A01
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Changes in Small Farmer Credit Use in Southern Brazil, 1965-69. (Br-332.71-A211).
Occasional paper, Jun 69-Feb 72
Dale W. Adams, and Joseph L. Tommy. 11 Feb 72, 10p Occasional Paper-61, AID-BR-332.71-A211
Contract AID/csd-2501

Keywords: *Brazil, Credit, Surveys, Banking business, Policies, Statistical data, Economic analysis, Classifications, *Agricultural economics, Small farmers, Nonbank credit.

The paper summarizes the results of a study in southern Brazil which was focused at determining the characteristics of farmers who received additional bank credit during the period 1965 to 1969. Information is also presented on changes in use of non-bank credit among farmers over the same period. Data were drawn from two sample surveys covering farm operation in 1965 and 1969 for 289 farms in southern Brazil. All of the units had 124 acres or less. Principle economic activities on the farms included various mixed enterprises of corn, beans, rice, wheat, hogs and dairy. Inducing banks to loan in a more socially efficient manner appears to be a major challenge. (Author Modified Abstract)

PB-219 702/8 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Development of Agricultural Mechanization Technologies at the International Rice Research Institute. (Fea-631.3-K45).
Rept. for Jul 65-Jan 73
Amir U. Khan, and Bart Duff. Jan 73, 25p Paper-72-02, AID-FEA-631.3-K45
Contract AID/csd-2541
Presented at Woodrow Wilson School, Princeton Univ., 20-23 Sep 72, and At Council for Asian Manpower Studies at Penang, Malaysia, 3-5 Jan 73.

Keywords: *Agricultural machinery, Design, Rice plants, Cultivation, Efficiency, Production capacity, *Southeast Asia, Philippines, *Rice.

The Instiute recognizes the urgent need for suitable farm machines for tropical agriculture and the catalytic role that machinery design and development activities can play in the establishment of an indigenous farm equipment manufacturing industry in the South and South-East Asian region. The IRRI program of machinery development is therefore sharply focused towards providing designs of agricultural machines for the production and processing of rice with two major objectives in mind. One, the machines must meet the requirements of the 2-to 10-hectare farmers who can neither afford to use imported mechanization technology nor work efficiently with traditional methods. Two, the machinery designs must use to a maximum extent, locally available manufacturing methods, materials, labor and other resources of the region. (Author Modified Abstract)

PB-219 703/6 PC A02/MF A01
Johns Hopkins Univ., Baltimore, Md. Dept. of Pediatrics.
Report on Wheat-or Oat-Soy Mixtures. (612-398-G739b).
Progress rept. Jul 66-Dec 71
George G. Graham. Dec 71, 16p AID-612-396-G739b
Contract AID/csd-1433, AID/csd-2946

Keywords: *Wheat, Proteins, Cereals, Nutrition, Flours(Food), *Soybeans, Oats, Diets, Lysine, *Food products, *Food fortification.

Much of the effort directed at improving the diets of needy people is centered on the improvement of the protein content and quality of cereals by the addition of protein-rich foods, protein concentrates, or essential amino acids. The combination of wheat and soy flours makes much sense as the second should correct the lysine deficiency of the first. Such a mixture is now being made available by our government in its international programs as WSB, or wheat-soy-blend. The study reports its evaluation in the diet of convalescent malnourished and normal infants and children. Included are results obtained with another wheat-soy blend and with an oat-soy blend. (Author Modified Abstract)

PB-219 708/5 PC A03/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Tour of Some U. S. Grain Storage Facilities for Entente Fund Officials. (Afr-631.23-C559).
Trip rept. no. 30, 11 May-16 May 72
Do Sup Chung. May 72, 27p AID-AFR-631.23-C559
Contract AID/csd-1588
Report on Food Frain Drying Storage. Handling and Transportation.

Keywords: *Grains(Food), Storage, Buildings, Evaluation, Surveys, Facilities, Kansas, Developing countries, West Africa, Problem solving, Silos, *Food storage.

A four day tour of grain storage facilities for Entente Fund officials was conducted by Kansas State University. Fundamental principles concerning condensation and problems related to condensation in metal storage buildings were discussed. The following aspects were considered to be important in reducing the possibility of condensation in metal storage facilities for bagged grains: (1) adequate ventilation (2) white paint used to paint the exterior, (3) do not stack grain bags against the walls, and (4) cover the grain pile with a plastic sheet, or put insulation on the roof inside of the storage building, thus creating at least a twenty-degree F. temperature differential between the interior and exterior air. (Author Modified Abstract)

PB-219 710/1 PC A02/MF A01
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand. (Th-633.18-B974).
Rept. for Dec 70-Feb 72
William R. Burton, and Tongruay Chungtes. Feb 72, 16p Occasional Paper-52, AID-TH-633.18-B974
Contract AID/csd-2805
Presented at Kasetsart University, Bangkok, Thailand. Feb 1-4, 1972.

Keywords: Rice plants, Farms, Farm management, *Thailand, Production capacity, Selection, Cost factors, Rural areas, *Rice.

The research paper discusses field research in Thailand on certain economic aspects of new rice technology, particularly the new high yielding rice varieties and associated inputs. The actual location of the study area was in Suphan Buri Province, some 100 kilometers northwest of Bangkok, Thailand. A total of 153 rural households in six villages cooperated in the study. Forty of the rice farms were located in a deep water, broadcasted area where floating rice varieties are grown. The remaining 93 rice-farms were in a transplanted rice area where many farmers were growing the new high yielding rice varieties. The authors provide summary tables on the following topics: table of farms; planted area and varieties grown; farmers growing new varieties; area and variety planted for the 1970 and 1971 seasons. They include summary discussions of high yielding varieties other new rice technology, research and costs of production. (Author Modified Abstract)

PB-219 711/9 PC A02/MF A01
Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.
Economic Aspects of Irrigation from Ground Water. (Br-631.7-H279a).
George H. Hargreaves. 1972, 23p AID-BR-631.7-H279a
Contract AID/csd-2167
Presented at National Ground Water Symposium, Sao Carlos, Sao Paulo, Brazil, 27 Nov-1 Dec 72.

Keywords: *Irrigation, Agricultural economics, *Ground water, *Brazil, Design, Cost estimates, Drainage, Arid land, Farm crops, Soybean plants, Wheat plants, Forage crops, Cotton plants.

Typical examples of economic analysis of ground water development in Brazil are discussed, citing specific data for Bolivian conditions with conversion to Cruzeiro values, but without a detailed knowledge of commodity prices and costs in Brazil. Use of ground water can produce both irrigation and drainage benefits -- pumping from underground reservoirs has alleviated many drainage problems. Typical irrigation systems were selected, designs developed, and costs estimated. From theoretical considerations, and from available crop, moisture - yield relationships developed in other areas, the supply of adequate moisture properly distributed throughout the growing season should at least double production for cotton, sugar cane, soy beans, wheat, forage crops, and others with similar water requirements. Irrigation costs are analyzed. (Author Modified Abstract)

PB-219 712/7 PC A15/MF A01
Georgia Univ., Athens.
A Literature Review and Research Recommendations on Cassava 'Manihot Esculenta Crantz'. (016.66423-H495).
Research rept. Jul 69-Mar 72
C. H. Hendershott. Mar 72, 341p AID-016.66423-H495
Contract AID/csd-2497

Keywords: Farm crops, Agronomy, Food, Developing countries, Food supply, Production, Ecology, Botany, Genetics, Soils, Cultivation, Plant diseases, Nutritive value, Biochemistry, Economics, Market research, *Crops, Cassava.

In the fall of 1969, a team of scientists from the University of Georgia was commissioned by the Technical Assistance Bureau of the Agency for International Development to (1) compile on a systematic basis the available information about cassava and related research now in progress; (2) synthesize, appraise, and analyze the information gathered and to determine as near as possible the broad limitations and potential of cassava as a food and feed crop; and (3) to prepare a list of research needs in their order of importance, for the orientation of future research on cassava. This team, consisting of ten men, represented the areas of Agronomy, Animal Nutrition, Botany, Economics, Food Science, Genetics, Horticulture, Human Nutrition and Plant Pathology. Each of their reports appear as a separate chapter in this manuscript and in each case represents their own view on cassava in their particular area of speciality. (Author)

PB-219 713/5 PC A03/MF A01
North Carolina State Univ., Raleigh. Dept. of Soil Science.
Agronomic Practices for Optimizing the Yield Potential of Short-Statured Rice Varieties in Latin America. (Lat-633.18-S211).
Research paper Jun 70-Nov 71

Pedro A. Sanches. Oct 71, 47p AID-LAT-633.18-S211
Contract AID/csd-2806
Presented at Seminar on Rice Policies for Latin American Centro Internacional de Agricultura Tropical, Cali, Colombia, 11 Oct 71.

Keywords: Rice plants, Cultivation, *Latin America, Seasonal variations, Climate, Soil fertility, Weed control, Irrigation, Plant growth, Production capacity, Fertilizers, *Rice.

The purpose of this paper is to illustrate the varietal response to specific cultural practices as examples of the kind of information needed for optimizing yields in each rice growing area in Latin American countries. Time of planting in relation to weather patterns is discussed for upland rice and irrigated rice. Planting systems, seed density and spacing are explained for upland rice systems, direct seeded-irrigated systems, and transplanted systems. Nitrogen response and response to other nutrients are descrihed under rice fertilization. Weed control and harvest timing are included as important cultural practices. Examples of cultural practices interactions, total production costs and revenues and the effects of nitrogen levels are provided under economic considerations. The author concludes that the possibility of increasing rice yields throughout the different cropping systems in Latin America seem excellent if proper agronomic practices are adopted. (Author)

PB-219 721/8 PC A02/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Development of a Simple Storage Unit and Storage Method Applicable for Humid Areas in Developing Countries. (631.23-C559).
Progress rept. no. 31
Do Sup Chung. 30 Jun 72, 24p AID-631.23-C559
Contract AID/csd-1588
Report on Food Grain Drying, Storage, Handling and Transportation.

Keywords: *Grains(Food), Storage, Environmental tests, Humidity, Developing countries, Environment simulation, Corn, Containers, Dessicants, Silica gel, Test chambers, Observation, Fungus deterioration, Time, Effectiveness, Adsorbents, *Food storage, Humid regions.

The development of a simple, inexpensive grain storage unit and storage method which can be used at farm and local levels in humid areas in order to preserve the quality of grain is discussed. Losses result from inadequate facilities and improper handling of food grains. Efforts are devoted to the development of storage that would not require electricity, and that could be easily maintained and operated by unskilled labor. Materials, methods, time and partial results are discussed. The grain used in this preliminary report was corn. A silica-gel adsorbant appears feasible, but cheaper drying agents are needed. (Author modified abstract)

PB-219 723/4 PC A04/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Agricultural Equipment Development Research for Tropical Rice Cultivation. (Rp-631.3-I61b).
Semiannual progress rept. 1 Jul-31 Dec 72, No 15
Amir U. Khan, Fred E. Nichols, and Bart Duff. Dec 72, 59p AID-RP-631.3-I61b
Contract AID/csd-2541

Keywords: *Agricultural machinery, Design, Rice plants, Cultivation, Production, Field tests, Test methods, *Philippines, *Rice.

The major objectives of the contract continue to be the design, development, testing and extension of agricultural machinery for use by small-and medium-scale rice producers and processors in the tropics. Response from manufacturers now producing and those contemplating production of the 4-6 hp power tiller has been encouraging. Two manufacturers are now building a total of 200 power tillers a month in the Philippines. Evaluation of various machine concepts for the application of non-selective herbicides in rice and upland crops was initiated. The design of the axial-flow thresher neared completion. High output, multicrop use, simplicity in design, and ease of local manufacture should make it widely acceptable in most Asian countries. The second prototype of the PTO thresher is approaching completion. Following final testing and evaluation, it will be released to manufacturers for production. Simple lifting-finger mechanisms for harvesting lodged crops were installed on the stripper harvester. Field trials with the stripper harvester indicate that grain losses with the field machine have been reduced to 6 percent. Additional modifications should further reduce these losses. (Author)

PB-219 725/9 PC A03/MF A01
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.
Methodology and General Data Description: Farm Level Capital Formation in Sao Paulo, Brazil. (Br-338.1-W515).
Occasional paper, Jun 69-Dec 71
Kelso L. Wessel, and William C. Nelson. Dec 71, 44p
Occasional Paper-47, AID-BR-338.1-W515
Contract AID/csd-2501

Keywords: *Agricultural economics, Capital, Farm management, *Brazil, Surveys, Economic analysis, Production, Productivity, Statistical data, Prices, Classifications, Income, Consumption, Savings, Investments, Financing, San Paulo(Brazil), Government credit programs, Land tenure, Technical assistance.

The focus of the research paper is on the capital formation process on Brazilian farms, with special emphasis on the role of credit and technology in bringing about rapid changes in agricultural production and/or productivity. An agricultural survey was made of 383 farms in the state of Sao Paulo, Brazil, in 1970 in order to obtain the necessary farm level data. Several homogenous groups were identified which reflected farm characteristics of size, type, technology, tenure, market orientation, management level and mechanization. Analyses were made of farm organization, income, consumption, savings, investment and other distinguishing characteristics to show the production-income-growth process for each group. (Author Modified Abstract)

PB-219 726/7 PC A06/MF A01
Center for Disease Control, Atlanta, Ga.
Central America Malaria Research Station. (Lat-614.4323-D419a).
Final rept. Mar 67-Jul 72
Geoffrey M. Jeffrey. 30 Jun 72, 120p AID-LAT-614.4323-D419a
Grant PASA-RA(HM)-2-67
Report on Malaria Program.

Keywords: *Malaria, Disease vectors, Culicidae, Ecology, Insect control, Antimalarials, Insecticides, Public health, Epidemiology, Parasitic diseases, *Central America, *Diseases.

Central America was selected as the site for a research station because the malaria programs of the region had been facing numerous problems. Among the first work initiated by CAMRS were intensive studies on the ecology of the malaria vectors. The information from these continuing studies on activity patterns, breeding cycles and habitats, and vector associations with man has guided the selection and timing of anti-mosquito activities including dry-season larviciding of river habitats, water-management practices in coastal estuaries, exterior spraying of houses, ULV spraying, and release of sterile male mosquitoes. The results of a pyrimethamine-primaquine mass distribution field trial enabled CAMRS to recommend against an expensive change-over of drugs and, in addition, yielded information on the reasons for the low acceptance in mass drug distribution programs.

PB-219 730/9 PC A03/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Micro-Level Farm Management and Production Economics Research among Traditional African Farmers: Lessons from Sierra Leone. (Si-631.09664-S745).
Dunstan S. C. Spencer. Sep 72, 35p AREP-3, AID-SL-631.09664-S745
Grant AID/csd-3625
See also report dated Jan 73, PB-219 757, and report dated Sep 72, PB-219 729.

Keywords: Farm management, *Africa, *Rice, *Sierra Leone, *Agricultural economics, Production, Manpower, Capital, Management methods, Land use, Output, Mathematical models, Estimating, Cost analysis, Model farms.

The paper describes experiences in collecting data in West Africa for planning as well as other purposes. Suggestions are made as to how some methodological problems can be handled. Lessons are drawn mainly form a study of rice production in Sierra Leone. A stratified area sampling technique involving 240 farmers was used to secure input-output data for a linear programming study of the rice industry. General recommendations are made on methods of farm management and production. (Author modified abstract)

PB-219 734/1 PC A04/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Tailoring of Fertilizers for Rice. (633.18-T297b).
Final rept. 1968-1972
O. P. Engelstad, J. G. Getsinger, and P. J. Stangel. 1972, 57p AID-633.18-T297b
Contract PASA-RA(QA)5-69

Keywords: Rice plants, *Fertilizers, Evaluation, Inorganic nitrates, Phosphorus inorganic acids, Zinc inorganic compounds, Tropical tests, Field tests, *Rice.

The agronomic activities under this project included basic research and preliminary evaluation of new fertilizers for rice at TVA in Alabama and by field studies in India, Thailand, Ceylon, the Philippines, Peru, Brazil and Columbia. The materials tested included various forms of nitrogen, phosphate and zinc. (Author Modified Abstract)

PB-219 735/8 PC A02/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Potential Fertilizers for Developing Countries. (631.8-T297a).
Summary rept. Jul 68-Jul 72.
Aug 72, 20p AID-631.8-T297a
Contract PASA-TA(QA)-6-69

Keywords: *Fertilizers, Developing countries, Evaluation, Ureas, Phosphate inorganic acids, Phosphate deposits, Sulfates, Tropical regions.

The report presents a brief summary of tests recently made or in progress for production of several potential fertilizer materials that may have application in developing countries. Such materials include urea-phosphate rock, urea-single superphosphate based materials, urea-ammonium sulfate, granulated rock phosphate and improved urea. Emphasis is placed on the use of urea since it is now and will continue to be the most important nitrogen source in developing countries. Tests thus far are promising for development of a coating material which will improve the physical characteristics of urea used under tropical conditions. (Author Modified Abstract)

PB-219 739/0 PC A04/MF A01
Auburn Univ., Ala. Dept. of Fisheries and Allied Aquacultures.
Aquacultural Survey in Japan. (Ja-639.3-S355).
H. R. Schmittou. 1 Feb 72, 73p AID-JA-639.3-S355
Contract AID/csd-2780

Keywords: *Aquaculture, *Japan, Fisheries, Oysters, Shrimps, Shellfish, Water pollution, Cost factors, Evaluation.

The purpose of this survey was to assess the value of Japan's aquacultural methods in terms of direct or indirect application in other countries, and to evaluate present and future status of aquacultures in Japan. The aquacultures discussed are: Ayu, Japanese eel, Yellowtail, Japanese oyster, and the Japanese Kuruma shrimp. Japan is faced with serious problems in most of its aquacultures. Only few of the methods of culture developed can be applied in other countries. If present methods are continued, many cultures will suffer limited growth and some may decline. The most serious problem and the ultimate limiting factor is the cost of production. Feed and labor are the two primary cost items of all cultures. Pollution is another problem. Another problem is having to depend on natural populations for young animals for stocking. A potential disease problem results from the feeding of uncooked trash fish also, and this particular problem has manifested itself in the yellowtail culture. Various stocking

programs and ways to artificially reproduce fish stocks are discussed. (Author Modified Abstract)

PB-219 740/8 PC A03/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
Ammonia-Urea Solution for Ammoniation-Granulation in Brazil. (Br-668.62-A179).
Frank P. Achorn, and Owen W. Livingston. Jun 72, 35p AID-BR-668.62.A179
Contract PASA-TA(QA)-6-69

Keywords: *Fertilizers, Manufacturing, Granulation, Solutions, Ammonia, Urea, Grinders, Handbooks, Inorganic phosphates, *Brazil.

Many countries are considering alternative methods for increasing the output of fertilizers and fertilizer intermediates. Numerous studies have been made for various countries surveying alternative production schemes which could be utilized. The report gives details of granulation process based on the ammoniation of superphosphates with ammonia-urea solution in a rotary-type drum granulator. Granulation is a process whereby rounded or spherical particles are produced through a fusion, solution, crystallization, or cementing process between various materials. To obtain spherical particles, it is necessary to impart a rolling-type action to nuclei; these nuclei serve as a base for building larger particles which grow to product size. Information for this report is based on actual experience during startup and operation of a plant in Porto Alegre, Brazil. The ammoniation-granulation plant there consists of a volumetric-type solid feed system, ammonia-urea solution feed system, TVA drum ammoniator-granulator, dual pan granulators, dryer, cooler, and screening system. Data are given to illustrate the possibility of grades that can be made for a plant of this type. (Author modified abstract)

PB-219 741/6 PC A05/MF A01
North Carolina State Univ., Raleigh. Dept. of Soil Science.
Soil Nitrogen: Supply Processes and Crop Requirements. (631.42-B287).
W. V. Bartholomew. Oct 72, 87p Technical Bull-6, AID-631.42-B287
Contract AID/la-464
Report on International Soil Fertility Evaluation and Improvement Program.

Keywords: Soil fertility, Nitrogen, Grains(Food), Soil fertility, *Fertilizers, Plant growth, Rainfall, Production capacity, Soil properties, Availability, Nitrites.

Nitrogen use in modern agriculture has increased greatly with the growth of population and in turn the need for increased food production. Of all the soil elements essential for plant growth, nitrogen is the most likely to limit crop growth. Attention is focussed on some of the principles affecting nitrogen availability and use which provide for maximum efficiency in the production of cereal crops. In forecasting fertilizer nitrogen needs, several use factors are collectively evaluated. Crop requirements are determined first. The kind of crop, expected yield, amount of nitrogen absorbed and used by the plants at the projected yield level. Expected yield levels depend mostly on soil properties and climatic factors. The amount of nitrogen expected from the soil and natural resources are assessed through mineralization, biological fixation, and additions from rainfall. An evaluation of all these processes are obtained by measuring the yield of a crop when no nitrogen fertilizer has been applied. (Author Modified Abstract)

PB-219 744/0 PC A07/MF A01
Yale Univ., New Haven, Conn. Economic Growth Center.
The Relevance and Prospects of Small Scale Industry in Colombia. (Co-338.64-B534).
Discussion paper
Albert Berry. 25 Apr 72, 139p EGC-DP-142, AID-CO-338.64-B534
Contract AID/csd-2492

Keywords: Industrial relations, *Colombia, Productivity, Scale(Ratio), Plants(Industries), Magnitude, Economic surveys, Statistical analysis, Development, Efficiency, Labor relations, Policies, Predictions, *Industrial development, *Small businesses, Technological development,

There is a shortage of documented information on Colombia's small scale industry. An approach utilized here focuses on, (1) the historical development (with emphasis on the last 20 years) of small scale production, (2) management performance in terms of the actual and potential efficiency with which converts resources into output, (3) the growth tendencies of plants and firms over a period of time according to their sizes, (4) the relative factor productivity compared to larger industry, and (5) possible strategies for the success of this form of production. The data indicate that small and medium plants are on somewhat higher output/capital ratios than larger ones. (Author Modified Abstract)

PB-219 74[illegible]/3 PC E99/MF A01
National Fertilizer Development Center, Muscle Shoals, Ala.
More Wheat from Fallow Farming. (Tu-633.11-H529).
Research rept.
Homer M. Hepworth. Jan 73, 55 AID-TU-633.11-H529

Keywords: *Wheat, Production capacity, Soil water, Water storage, Conservation, Soil erosion, Weed control, Fertilizers, Climate, Cultivation, Statistical data, Agronomy, Turkey, *Soils, Fallowing.

Statistics show that wheat production varies widely even in areas of the same climatic conditions. Research conducted by National Wheat Improvement Center provides necessary information and production sources for optimum wheat production in the shortest possible time. It is observed that moisture conservation in soil (fallow system) with other improved agronomic practices can produce the optimum yield capacity. An effective fallow system involves storing water when it comes as rain or snow and minimizing losses prior to planting the crop. Research and training programs are designed to adapt improved technology to local conditions. Also presented is an analysis of the approach taken to facilitate the transfer of technology to local conditions in Turkey. (Author Modified Abstract)

PB-219 757/2 PC A04/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Economic Analysis of Agricultural Production and Labour Utilization among the Hausa in the North of Nigeria. (Afr-338.1-N842).
African rural employment study Apr 66-Mar 67
D. W. Norman. Jan 73, 53p AREP-4, AID-AFR-338.1-N842
Grant AID/csd-3625
See also report dated Sep 72, PB-219 730.

Keywords: Agriculture, *Nigeria, Farm management, Surveys, Communities, Rural areas, Data acquisition, Classifications, Land use, Manpower, Seasonal variations, Financing, Income, Statistical data, Linear programming, Farm crops, *Agricultural economics, Zaria(Nigeria).

A case study examines the farming practices and production of Moslem farmers in the Zaria area of Northern Nigeria. Three Moslem villages were selected; Hanwa, which borders on Zaria itself, Doka, and Dan Mahawayi. The results of the study were derived from 42 farming families in Dan Mahawayi and 62 families in the other 2 villages. Data were secured on land and labor; seasonality of farming and off-farm occupations; farm capital goods and cash expenses; acres, yields and location of food and cash crops; composition of farm and family income; and comparative statistics for large and small farms in the three villages. (Author modified abstract)

PB-219 758/0 PC A12/MF A01
North Carolina State Univ., Raleigh. Dept. of Soil Science.
A Review of Soils Research in Tropical Latin America. (Lat-631.4072-N884).
Review rept. Jul 70-Jul 72
P. A. Sanchez, W. V. Bartholomew, S. W. Buol, F. R. Cox, and E. J. Kamprath. 1972, 272p AID-LAT-631.4072-N864
Contract AIDcsd-2806

Keywords: Soil surveys, *Latin America, Tropical regions, *Soils, Reviews, Soil properties, Investigations, Soil classification, Morphology, Food, Farm crops, Soil fertility, Cultivation, Acidity, Soil texture, Fertilizers, Nitrogen, Phosphorus, Potassium.

The publication is a comprehensive review of the available literature on soils research in the American tropics. This area comprises all countries of Latin America and the Caribbean excluding Argentina, Chile and Uruguay. A search was made of biological abstracts for work in the region. Approximately 1,000 abstracts were obtained on research published since 1960. Additional materials were obtained from Tropical Abstracts, the Latin American Bibliography of Agriculture and the authors' personal files. Emphasis is placed on the main food and feed crops of tropical America grown by small and medium sized farmers. The review covers the following topics of soil research: soil genesis, morphology and classification; soil physical properties: soil management under shifting cultivation; soil nitrogen in the tropics; nitrogen fertilization; soil acidity and liming; potassium; phosphorus; sulfur; and micronutrients. (Author)

PB-219 759/8 PC A02/MF A01
Cornell Univ., Ithaca, NY. Dept. of Agronomy.
Relationships among Physical and Chemical Properties of Representative Soils of the Tropics from Puerto Rico. (Rq-631.42-P555).
Agronomy paper for Jun 69-Mar 73
Warren R. Philipson, and Matthew Drosdoff. Mar 72, 6p Agronomy Paper-893, AID-RQ-631.42-P555
Contract AID/csd-2490
Pub. in Soil Science Society of America Proceedings, v36 n5 p815-819, Sep-Oct 1972.

Keywords: Soil properties, Tropical regions, *Puerto Rico, Soil surveys, Soil horizons, Regression analysis, Soil chemistry, Soil profiles, Soil water, Cation exchanging, Tables(Data), *Soils.

In an investigation of the extent to which predictive soil property relationships can be relied upon in characterizing soils of the tropics classified at the reconnaissance level, 9 to 15 soil properties, of 370 horizons, from 84 Puerto Rican profiles, were studied by correlation and multiple linear regression. The soils represented six orders of the new U.S. Soil Taxonomy (7th Approximation): Vertisols, Mollisols, Alfisols, Inseptisols, Ultisols, and Oxisols. Multiple regression equations were formed from the data of each order, with 15-bar moisture content, CEC, organic carbon, extractable iron, and base saturation as dependent variables. The results indicate that, although it is possible to eliminate certain properties from tropical soil data acquisition and still adequately characterize the soil, the specific properties that can be successfully eliminated depend on the soil order. (Author)

PB-219 760/6 PC A02/MF A01
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
New Seed Varieties and the Small Farm. (In-631.521-S346).
Rept. for Dec 70-Mar 72
M. Schulter, and John W. Mellor. Jun 72, 22p AID-IN-631.521-S346
Contract AID/csd-2805
Also pub. as Cornell International Agricultural Development Reprint 52.

Keywords: *Seeds, Selection, Farm management, *India, Farms, Production, Irrigation.

The study explores the relationship that exists between adoption of the new seed varieties and size of farm for the small farmer in India. In this analysis a farmer is defined to have 'adopted' if he has put any part of his acreage under the new varieties. Tables are provided summarizing the results of the linear regression between proportion of farmers adopting the farm size for 70 cases. This analysis has been largely oriented to the adoption problems of the small farmer. Particular in the rice areas, among adopting farmers, the larger farmers seem to adopt on a smaller proportion of their acreage than the smaller farmers. The authors also discuss tenancy, irrigation, credit and uncertainty as factors affecting adoption. (Author Modified Abstract)

PB-219 768/9 PC A03/MF A01
Ohio State Univ., Columbus. Dept. of Agricultural Economics and Rural Sociology.

Technological Change and the Traditional Small Farmer of Rio Grande Do Sul, Brazil. (Br-631-R225).
Occasional paper
Norman Rask. Jun 72, 37p Occasional Paper-85, AID-BR-631.R225
Contract AID/csd-250'
Report on 'Studies in Agricultural Capital and Technology.'

Keywords: *Agricultural economics, *Brazil, Economic development, Statistical data, Management methods, *Land use, Farm crops, Livestock, Manpower, Deomographic surveys, Education, Income, Communities, Technological change, Small farmers, Rio Grande do Sul(Brazil), Lajeado(Brazil).

The paper concerns research on the determination and evaluation of capital formation and the relationship of this process to technological change and economic development for the small farmer of Rio Grande Do Sul in Brazil. The author provides a general background of the geographic region and settlement patterns and a general description of small farm agriculture as it is practiced in this Brazilian state. The study reports on rates of technological change on farms as related to farm size, technology available, and institutional settings. Findings are related to those for large farms. A case study of more than 6500 small farms located in the municipio of Lajeado is presented. (Author Modified Abstract)

PB-219 772/1 PC A03/MF A01
Yale Univ., New Haven, Conn. Economic Growth Center.
Rural-Urban Migration. Urban Unemployment and Underemployment, and Job Research Activity in Ldcs. (331.127-F461).
Discussion paper
Gary S. Fields. Dec 72, 29p EGC-DP-168, AID-331.127-F461
Contract AID/csd-2492

Keywords: Unemployment, Developing countries, Urban areas, Mathematical models, Population migrations, Rural areas, *Employment, Underemployment.

A formal theoretical model is presented, with which the equilibrium allocation of the labor force between labor markets is analyzed. Following the model of Harris and Todaro, the focus is on the voluntary movement of workers between labor markets as the equilibrating force, instead of the more conventional mechanism of wage adjustment. Four additional factors are considered: a more generalized account of the process of search for urban jobs; favoring of educated workers over uneducated workers by employers in hiring; the possibility of unemployment in the so-called 'murky sector'; and recognition of labor turnover in a multiperiod framework. Results are compared with predictions by Harris and Todaro. Urban unemployment rates were found to be considerably lower than predicted by the Harris-Todaro model. The theory of quantity adjustment being the equilibrating mechanism in labor markets is considered. Results presented demonstrate that the resulting framework gives predictions that are closer to actual experience than the Harris-Todaro model.

PB-219 774/7 PC A07/MF A01
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
Planning Small Water Supplies in Developing Countries. (628.72-L384).
Final rept. Jul 69-Jul 72
Donald T. Lauria. 1972, 141p AID-628.72-L384
Contract AID/csd-2494

Keywords: *Water supply, Developing countries, Water resources, Community development, Management, Economic models, Benefit cost analysis, Demand(Economics), Supply(Economics), Construction, Central America.

The research included two principal objectives: (1) develop a theoretical planning model for deciding water supply timing and scale in small communities of developing countries; (2) initiate field studies to obtain data on the parameters of the model to make it operational. The work of model development had to focus on several communities instead of only one. Additionally, time in the model had to be made discrete because budgets are imposed at fixed points in time. Finally, the model had to include the considerations of Manne's model pertinent to developing countries: economies of scale, water supply benefits, increasing demand, the discount rate, etc. While the first research objective is theoretical, the second is pri marily applied. It was proposed to obtain at least preliminary information on water demand patterns in small commun ities, costs of water system construction, the economies of scale of water systems abroad, an by imputing, the benefits of publicly supplied water. All of the field data were obtained from Central America. (Author)

PB-219 777/0 PC A03/MF A01
Harvard Univ., Cambridge, MA. Center for Science and International Affairs.
A Subjective Equilibrium Theory of Share Tenancy. (333.53-W286).
Economic rept., 31 May 67-Oct 72
Peter Warr. Oct 72, 31p Economic Development-222, AID-333.53-W286
Contract AID/csd-1543

Keywords: *Agricultural economics, Developing countries, *Land use, Economic analysis, Reviews, Economic development, Production, Uncertainty principle, Allocations, Policies, Labor relations, Sharecropping, Tenancy, Resource allocation, Land reform.

An economic development report reviews the analytics of share tenancy for land reform and other aspects of agricultural policy in the developing nations. Section 1 discusses the comparative statics of resource allocation under share-cropping, fixed rent tenancy, and capitalist production using wage labor. The implications of production uncertainty are treated in section 2 and are related to the conclusions of the previous section. Production uncertainty is shown to modify the comparative static conclusions on resource allocation and to provide an explanation for the existence of share-cropping despite its alleged inefficiency. (Author)

PB-219 778/8 PC A06/MF A01
Economic Research Service, Washington, DC.
Agricultural Development and Farm Employment in India. (In-630.954-S798).
William J. Staub. Jan 73, 122p AID-IN-630.954-S798
Pub. as Foreign Economic Rept. no. 84.

Keywords: Farm management, *Employment, *India, Agricultural machinery, Expenses, Fertilizers, Seeds, Rice plants, *Agriculture, Agricultural development.

The 'green-revolution' has come to Asia, but Indian workers have nothing to fear from technology. This study finds increased use of modern purchased imputs generates an increase in the amount of labor employed per farm. The various inputs investigated are: (1) farm size, (2) irrigation expenses, (3) investment in farm machinery, (4) bullock labor, (5) expenses for seed and fertilizer, (6) percentage of high-yield varieties used, (7) price of the dependent variable, and (8) the amount of human labor employed other than that included in the dependent variables. These factors were applied to Ferozepur and Thanjavur in the States of Punjab and Tamil Nadu, respectively, because of their similarity to other regions in India. (Author modified abstract)

PB-219 950/3 PC A02/MF A01
Washington State Univ., Pullman.
Waste Treatment for Small Flows
J. F. Kreissl. 1971, 25p
Presented at the Annual Meeting American Society of Agricultural Engineers, Washington State Univ., Pullman, Wash., 27-30 June 1971.

Keywords: *Sewage treatment, Rural areas, Cost estimates, Water pollution, Septic tanks, Aerobic processes, Sanitary sewers, Force mains, Sewage disposal.

The report surveys the problems of waste treatment in rural areas. It describes various treatment alternatives and gives cost estimates.

PB-219 980/0 PC A03/MF A01
Alaska Univ., College. Inst. of Water Resources.
Sludge Production and Disposal for Small, Cold Climate Bio-Treatment Plants
Completion rept.
Timothy Tilsworth. Dec 72, 50p IWR-32, OWRR-A-033-ALAS(2)
Contract DI-14-31-0001-3202, DI-14-31-0001-3502

Keywords: Sludge drying, Freezing, *Sewage treatment, Dewatering, Sludge disposal, Design criteria, Sand filtration, Aeration, Activated sludge process, Cost estimates, Water pollution, Sludge treatment.

A sludge disposal process consisting of modified sand drying beds in combination with the freeze-thaw technique utilizing natural refrigeration was evaluated. The purpose of freeze-thawing of sewage sludge is principally to condition the sludge such that it is readily dewaterable and, subsequently, results in a reduced volume of solids to be further processed. The study consisted of three separate evaluations using three model drying beds for each respective run. Two of the beds were studied at sludge depths of six inches, and the third bed was evaluated at an eighteen-inch sludge depth. Settled activated sludge for placement on the model beds was obtained from the sedimentation tank of a local activated sludge plant.

PB-220 300/8 PC A02/MF A01
Illinois State Water Survey Div., Champaign.
Removal of Algae from Waste Stabilization Pond Effluents - A State of the Art
V. Kothandaraman, and Ralph L. Evans. 1972, 13p*
Rept no. ISWS-72-CIR-108

Keywords: *Algae, *Waste treatment, Harvesting, Lagoons(Ponds), Precipitation(Chemistry), Filtration, Clarification, Flotation, Centrifuging, Dewatering, Fertilizing, Feeding stuffs, Manufactured gas, Methane, Drying, Concentrating, Sewage treatment, Industrial waste treatment, Microstraining, Anaerobic lagoons, Aeration ponds, Water pollution control.

Treatment of municipal, industrial, and agricultural wastes employing stabilization ponds or lagoons has found increasing application within the past 20 or 30 years. Regardless of whether the lagoon is an oxidation pond, an anaerobic cell followed by an aerobic polishing pond, or a facultative lagoon, the effluent from each facility is likely to contain a significant concentration of algae. With the adoption of wastewater effluent standards by water pollution abatement agencies, particularly with respect to suspended solids and biochemical oxygen demand, it becomes imperative either to design the oxidation pond facilities on a total wastewater retention basis or to provide means for separating the algae from pond effluents and disposing of the harvested residue. This report summarizes the investigations of other research workers concerning methods of harvesting algae and disposing of that harvest, and should be helpful to consulting engineers and stream pollution abatement agencies. Since several of the separation techniques employed in these investigations are physiochemical processes, a brief introduction to the algal cell wall characteristics is presented before discussing the algal removal methods. (Modified author abstract)

PB-220 349/5 PC A18/MF A01
Office of Water Resources Research, Washington, DC. Water Resources Scientific Information Center.
Irrigation Efficiency. A Bibliography
Apr 73, 423p WRSIC-73-214, W73-09115

Keywords: *Irrigation, Bibliographies, Sprinkler irrigation, Efficiency, Abstracts, Policies, Management, Water supply, Design, *Arid land, Farm crops, Evapotranspiration, Salinity, Soil water, Water conservation, Utilization, Water consumption, Indexed(Documentation), *Water use.

The report, containing 272 abstracts, is another in a series of planned bibliographies in water resources to be produced from the information base comprising SELECTED WATER RESOURCES ABSTRACTS (SWRA). At the time of search for this bibliography, the data base had 53,230 abstracts covering SWRA through February 15, 1973 (Volume 6, Number 4). Author and subject indexes are included. (Author)

PB-220 525/0 PC A03/MF A01
Abt Associates, Inc., Cambridge, MA.
A Study of Rural Cooperatives: Summary Volume
Final rept. 1 Jul 71-28 Feb 73
William L. Hamilton. Feb 73, 37p OEO-LN-1368
Contract OEO-BIC-5296
Paper copy also available from NTIS, a set of 2 reports as PB-220 524-SET.

Keywords: Rural areas, Marketing, Economic development, Commerce, Reviews, Benefit cost analysis, Classifications, Socioeconomic status, Requirements, Objectives, Recommendations, Policies, *Cooperatives, Rural cooperatives.

An analysis is presented of rural cooperatives as a program to provide economic and non-economic benefits to low-income members and the rural community. (Author)

PB-220 526/8 PC A13/MF A01
Abt Associates, Inc., Cambridge, MA.
A Study of Rural Cooperatives: Analysis
Final rept. 1 Jul 71-28 Feb 73
William L. Hamilton. Feb 73, 279p OEO-LN-1369
Contract OEO-B1C-5296
Paper copy also available from NTIS, a set of 2 reports as PB-220 524-SET.

Keywords: Rural areas, Marketing, Economic development, Commerce, Benefit cost analysis, Socioeconomic status, Community development, Policies, Data acquisition, Management, *Cooperatives, Rural cooperatives.

The study is designed to answer questions dealing with developing and structuring programs of support to cooperatives. These questions involve the goals coops set, and how they are articulated, the different strategies a low-income coop may follow, and those which work best in various situations, the effectiveness of the low-income coops in accomplishing the goals they select, the internal and external factors related to success in delivering benefits, and the type and level of support low-income cooperatives need.

PB-220 825/4 PC A06/MF A01
National Academy of Sciences, Washington, DC.
Ferrocement: Applications in Developing Countries
Panel study.
Feb 73, 105p
Contract AID/csd-2584
Summaries in French and Spanish. Library of Congress Catalog Card No. 73-4027.

Keywords: *Reinforced concrete, Developing countries, Wire cloth, Boats, Food industry, Equipment, Roofing, Evaluation, China, Silos, Construction materials, Thailand, Ethiopia, New Zealand, *Ferrocement.

An ad hoc panel was convened to concentrate on three specific tasks: (1) evaluating the current state of the art of ferrocement as an engineering material; (2) evaluating the principal areas of application on both land and water; and (3) developing specific recommendations for promoting the use of ferrocement in a logical, effective manner. Specific areas covered in the report include: ferrocement for boatbuilding; for food-storage facilities; for food-processing equipment; for low-cost roofing; and materials technology. Appendicies discuss Ferrocement boatbuilding in a Chinese commune; Ferrocement food storage in Thailand; Ferrocement-lined underground grain silos in Ethiopia; and New Zealand ferrocement tanks and utility buildings.

PB-221 096/1 PC A06/MF A01
Louisiana State Univ., Baton Rouge. Dept. of Chemical Engineering.
Single Cell Proteins from Cellulosic Wastes
Final rept.
C. D. Callihan, and C. E. Dunlap. 1973, 105p* EPA-6702-73-02
Grant PHS-EC-00328

Keywords: Solid waste disposal, *Cellulose, Fermentation, *Agricultural wastes, Food processing, Bagasse, Proteins, Biodeterioration, Drying, Process variables, Cost estimates, Pilot plants, Utilization, Sugarcane, *Waste recycling, *Food fortification, Food supplements, High protein supplements, Hyperfiltration.

The need for protein feed and the need to dispose of waste cellulose are problems being studied to develop a feasible method for the direct conversion of cellulosic wastes to microbial protein--a single cell protein to be used as an animal feed supplement. This report presents data on the process and summarizes research in large-scale production. The economics and techniques of the conversion process are compared with work done by petroleum companies on the fermentation of hydrocarbons. Controlling variables used in the process are defined and significant goals necessary to achieve success in the field are described. The research deals mainly with the alkali treatment and fermentation parts of the process. Different micro-organisms from which single cell protein can be produced are given. Research in the areas of cell flocculation, flotation, or hyperfiltration are recommended to improve the most costly single step of the process-drying the cells. Methods of decreasing the degree of crystallinity are also included. The practicality of complete acid hydrolysis of cellulose to a soluble substrate for conversion to yeast protein and partial acid hydrolysis of the cellulose followed by microbial consumption is discussed. An economic analysis is given of the potential markets and the competitive cost with other proteins. (Modified author abstract)

PB-221 142/3 PC A07/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Mechanical Engineering.
Special Topics. Human Powered Transit; Remote Medical System; Water Treatment
Final rept.
John C. Purcupile. May 73, 130p*
Contract HUD-H-1558
See also PB-215 071.

Keywords: Bicycles, Research, Medical services, Trailers, Potable water, *Water treatment, Urban planning, Research, Design, Roads, Central city, Medical equipment, Osmosis, Urban areas, Rural areas, *Health, *Water supply.

The report includes final results of project presented in the December 17, 1971 publication, The New City, which addresses the useful application of technology to solving urban problems. Topics include: (1) Human Powered Transit - examines elements of a human powered system: human power output, vehicle design, roadway design, and potential areas for the system such as a CBD, campus, and planned community; (2) Remote Medical System - develops a conceptual design of a system using mobile vans, paramedics and telecommunication to provide health services in geographically remote or in inner city areas and includes a bibliography; (3) Water Treatment System - designs and builds an inexpensive water treatment system using the principle of reverse osmosis to provide safe drinking water in rural areas. This system will be introduced by Peace Corps and Vista workers in appropriate areas.

PB-221 171/2 PC A05/MF A01
Colorado State Univ., Fort Collins, Dept. of Avian Sciences.
Biological Conversion of Animal Wastes to Nutrients
Byron F. Miller. Jun 73, 82p* EPA-670/2-73-09
Grant EP-00262

Keywords: Agricultural wastes, Solid waste disposal, Materials recovery, Poultry, Feeding stuffs, Muscidae, Feeding stuffs, Biodeterioration, Temperature, Humidity, Chickens, Chemical analysis, Air pollution, Water pollution, Amino acids, Larvae, Utilization, Metabolism, *Bioconversion, *Animal wastes, *Waste recycling, *Manures, Catabolism, Musca domestica.

As part of studies to determine how living organisms may be used to catabolize poultry manure, larvae of house flies (Musca domestica) were used to process poultry manure, with the pupae being used as a feed supplement. Temperature and relative humidity conditions were determined to produce an optimum yield of dry pupae. Three feeding trials were conducted to evaluate fly pupae and catabolized poultry manure residue as protein sources for growing chickens. White Leghorn chicks, White Plymouth Rock chicks, and New Hampshire and Indian River broiler chicks were fed the various diets and differences in body weight and feed conversion were recorded. The results indicated that fly pupae have potential as a protein supplement in chick starter and broiler diets; the protein quality was found to be similar to that of meat and bone meal or fish meal, and superior to soybean oil meal.

PB-221 282/7 PC A02/MF A01
Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Applied Chemistry.
Pulping of Tropical Hardwoods: Individual and Mixed Species, Wood and Paper Properties, Resource Assessment
H. G. Higgins, F. H. Phillips, A. F. Logan, and V. Balodis. 1973, 25p Rept no. Technological paper-70
International Standard Book no. 0-643-00071-2.

Keywords: Wood pulp, Hardwoods, Resources, Tropical regions, Evaluation, Sampling, Test methods, Simulation, Density(Mass/volume), Kraft paper, Containers, Papers, Australia, *Pulp, *Paper, *Wood, Papua(New Guinea), Rain forests.

Mixed tropical hardwoods from Papua New Guinea provide unbleached pulps suitable for use in linerboards, bag and sack papers, wrapping paper, and corrugating medium, and bleached kraft pulps from some resources may be suitable also for high-grade printing and writing papers. In forest sampling the resource should be stratified on the basis of a forest inventory. Three approaches to evaluation have been adopted: (1) pulping tests on a representative wood sample, (2) tests on a simulated sample from the major species, and (3) construction of a 'theoretical' sample from measurements of basic density and pulping results on individual species. (Modified author abstract)

PB-221 494/8 MF A01
Caldwell Lace Leather Co., Auburn, Ky.
Secondary Waste Treatment for a Small Diversified Tannery
Environmental protection technology series
E. L. Thackston. Apr 73, 82 EPA-R2-72-209
Grant FWPCA-WPRD-25-01
Paper copy available GPO as EP1.23/2:73-209.

Keywords: Industrial waste treatment, Tanning materials, *Water pollution, Activated sludge treatment, *Leather, Design, Performance evaluation, *Water treatment, Tanneries, Water pollution control, Biological industrial waste treatment.

The Caldwell Lace Leather Co. of Auburn, Kentucky, a small tannery using primarily alum tanning but some chrome and vegetable tanning, received a demonstration grant to investigate and demonstrate methods of treating tannery wastes for discharge to a small stream. A research contract with Vanderbilt University produced findings which have previously been reported and are reviewed herein. A modified completely-mixed activated sludge plant was constructed, along with facilities to handle specific problem wastes. After it had been operating for a year, an EPA survey team conducted a study which showed that the plant was performing as predicted by the research phase, except for solids carryover from the secondary clarifier due to mechanical problems. After the problems were corrected, the plant began producing an effluent which more than met expectations, removing 97% of the suspended solids and 95% of the BOD. The report reviews the characteristics of the wastes and discusses the treatment process.

PB-221 876/6 PC A09/MF A01
Oregon State Univ., Corvallis. Dept. of Forest Products.
Utilization of Bark Waste
Final rept.
R. A. Currier, and M. L. Laver. Jul 73, 184p EPA-670/2-73-005
Grant EPA-R-EP-00276-4

Keywords: *Wood wastes, Utilization, Bark, Solid waste disposal, Materials recovery, Industrial wastes, Chemical composition, Pelleting, Fertilizers, Physical properties, Plastics, Solvent extraction, *Wood products, *Waste recycling.

The problem of bark waste that is generated by the forest products industry in the United States has become increasingly important. The major overall goal of the work covered in this report was to use physical and chemical sciences in coordinated studies to promote economic uses of bark in order to relieve pollution created by present methods of disposal. Physical utilization research included: investigating the preparation of bark pellets from bark; determining the components responsible for 'self-bonding' of bark; and investigating potential products from or applications of bark wastes obtained from production sources. Chemical utilization research included: preparing, for chemical studies, natural bark, bark that had been ammoniated to contain 4 percent nitrogen, and bark that had been

molded into pellets and then broken down into small particles; and investigating the chemical composition of each type of bark prepared.

PB-222 331/1 PC A02/MF A01
Hawaii State Dept. of Planning and Economic Development, Honolulu. State Center for Science Policy and Technology Assessment.
A Solid Waste Primer. Facts and Statistics on Solid Waste Handling Disposal
Ginger Plasch. 28 Jan 72, 11p
Grant NSF-GT-25
Presented at Solid Waste Recycling Conference, Honolulu, Hawaii, 27-28 Jan 72.

Keywords: Solid waste disposal, Hawaii, Materials handling Cost estimates, Legislation, *Waste disposal.

This short primer provides (a) a description of methods of handling and disposing of solid waste materials, (b) solid waste information and statistics concerning Oahu, (c) capsule information on Hawaii State legislation, and (d) some definitions of types of solid waste and methods of disposal. (Author)

PB-222 422/8 PC A04/MF A01
Florida Univ., Gainesville.
Composted Municipal Refuse as a Soil Amendment
Final rept.
C. C. Hortenstine, and D. F. Rothwell. Aug 73, 67p*
EPA-670/2-73-063
Contract EP-00250

Keywords: Solid waste disposal, Composts, *Fertilizers, Composts, Refuse disposal, Plant growth, Germination, Nitrification, Grain sorghum plants, Tomatoes, *Waste disposal, Cranberry beans, Pearl millet, Turnips.

Processed residential refuse from four municipal composting plants was evaluated as a source of plant nutrients and as a soil amendment. Indicator plants were turnip, pearl millet, cranberry beans, tomato, and sorghum. Three of the composts used were high in carbon and low in nitrogen, which resulted in delayed nitrification accompanied by poor plant growth. Total soluble salts in those composts were relatively high and could affect seed germination. Extracts of compost (160 g/500ml H2O) greatly reduced germination in radish and turnip seed, and extracts from 320 g compost/500ml H2O reduced germination to 0 in turnip and radish seed and to about 40 percent in oat and millet seed. After a period of time in the soil, compost applications above 32 metric tons/ha increased plant yields and improved soil cation exchange capacity and water-holding capacity. In laboratory studies with compost incorporated at various levels in Arredondo sand, almost no nitrification occurred. When mixed with cow manure in equal parts, compost effectively curtailed nitrification in the cow-manure almost 100 percent. (Modified author abstract)

PB-222 441/8 PC A03/MF A01
National Research Council, Bangkok (Thailand).
Workshop on Science Planning and Policy in Thailand, 3-6 July 1972
Final rept.
Jul 72, 48p
Contract AID/csd 2584
Sponsored in part by National Academy of Sciences, Washington, DC.

Keywords: Research management, *Thailand, Planning, Policies, Industries, Engineering, Natural resources, Utilization, Agriculture, Medicine, Public health, Meetings, Environmental engineering, Developing countries, *Science policy, *Industrial development.

The objective of the workshop was to consider the role of science and technology in relation to the development of Thailand, with particular emphasis on mechanisms for planning and implementing science policy in Thailand. Five working groups held discussions, and made recommendations, in the following areas: Industry and Engineering; Natural Resources and Utilization; Agricultural Production; Medicine, Public Health and Environmental Quality; and Academic Science.

PB-222 454/1 PC A05/MF A01
California Univ., Berkeley. Sanitary Engineering Research Lab.
Photosynthetic Reclamation of Agricultural Solid and Liquid Wastes
Ecological research series
Clarence G. Golueke, William J. Oswald, Gordonj L. Dugan, Charles E. Rixford, and Stanley Scher. Aug 73, 94p* EPA-R3-73-031
Grant EP-00272

Keywords: Solid waste disposal, Industrial waste treatment, *Agricultural wastes, Water pollution, Farms, Sewage treatment, Liquid waste disposal, Algae, Lagoons(Ponds), Sludge disposal, Feeding stuffs, Drying, Water reclamation, Materials recovery, Anaerobic processes, Fermentation, Pilot plants, Digestion(Decomposition), Performance evaluation, Houses, *Waste recycling, *Waste disposal, *Bioconversion, Water pollution control, Manure, Aeration ponds.

The overall objective of this study was to develop a system with which a large fraction of the wastes produced by agricultural industries could be converted into a useful material without imposing an unacceptable burden on the environment. Specificially, the project involved a detailed study of the basic characteristics of an integrated anaerobic fermentation and algae growth system for agricultural solid and liquid wastes on a laboratory and small pilot plant scale, with special attention being devoted to the reaction kinetics of the system. A substantial degree of nutrient recovery and recycle was also attained in the system.

PB-222 457/4 PC A06/MF A01
National Academy of Sciences, Washington, DC.
Workshop on Industrial and Technological Research. Volume III. Djakarta, Indonesia
Jane Wilkie, and Everett Lee. Jan 71, 120p OWRR-A-024-MASS(1)
Contract AID/csd-2584
Prepared in cooperation with Indonesian Inst. of Science (Lembaga Ilmu Pengetahuan Indonesia) Djakarta. See also Volume 1, PB-217 118, and Volume 2, PB-218 724.

Keywords: Economic development, *Indonesia, Meetings, Industrial relations, Project planning, Research and Development, Standardization, Quality control, Information systems, Management planning, Education, Specilized training, Growth, Developing countries, *Industrial development, Research utilization, Workshops, Technological development, AID.

The concern of the workshop was the strategy for using research, development, and engineering to assist in achieving the desired industrial growth in Indonesia. Volume (1) presented the overall findings and recommendations, and Volume (2) gave the plenary sessions and working groups reports.

PB-222 533/2 PC A02/MF A01
National Bureau of Standards, Washington, DC.
National Program of Metrology for Ethiopia
Thomas M. Stabler. 1972, 24p Rept no. NBS-10927
Grant PASA-TA(CE)-5-71

Keywords: *Metrology, *Ethiopia, Government policies, Project planning, Substitutes, Units of measurement, Standards, Personnel, Economic development.

A national program of metrology for Ethiopia is discussed under the following headings: program and alternatives; weights and measures proclamation and regulation; program plan; and personnel.

PB-222 920/1 PC A07/MF A01
Highway Research Board, Washington, DC.
Soil Stabilization
K. P. George. 1973, 132p Rept no. HRB-Record-442
International Standard Book no. 0-309-02173-1 , Library of Congress Catalog Card no. 73-11608.

Keywords: *Soil stabilization, Research, Pavement bases, Sands, Tensile strength, Bitumens, Soil cement, Calcium oxides, Creep properties, Alkali aggregate reactions, Shear strength, Emulsions, Soil associations, Tropical regions, Foundations, Meetings, *Pavements, *Roads.

Many aspects of stabilization of sand with cationic shrinkage cracking in soil-cement bases to stabilization of sand with cationic bitumen emulsion are discussed in papers presented at a conference on cracking of soil-cement held at the 52nd Annual Meeting of the Highway Research Board. Also presented are methods of improving the tensile strength of soil-cement, factors that affect the creep behavior of cement-stabilized soils, a method for predicting the freeze-thaw durability of stabilized materials, proposal of realistic cutoff dates for construction with lime-fly ash and lime-cement-fly ash mixtures, development of different indexes of lime reactivity for different soil groups, especially in tropical and subtropical areas, and effects of factors such as temperature and specimen age on the shear strength of sands stabilized with cationic bitumen emulsion.

PB-223 266/8 PC A15/MF A01
Academy for Educational Development, Inc., New York.
Technical-Economic Considerations in Public Service Broadcast Communications for Developing Countries
R. Butman, G. Rathjens, and C. Warren. 1973, 332p
Rept no. 73-9
Contract AID/csd-2829
Prepared in cooperation with the Massachusetts Inst. of Technology.

Keywords: *Education, Developing countries, *Television, Schools, Communication satellites, Education, Brazil, India, Ethiopia, Telecommunication, Economic factors, Policies, Cost analysis, Radio broadcasting, Services, Engineering, Satellite television systems, Technological development.

The report represents the culmination of an inquiry into the distribution of educational material in developing countries, with particular attention to the problems and opportunities in Brazil and India. Emphasis on the use of television and satellites to distribute T.V. programming is a reflection of the interest in the use of satellite-T.V. systems in two countries. The report includes techno-economic factors, cost and policy considerations, comments on expanding radio and television broadcasting services in Ethiopia, and technical aspects of educational communication technologies.

PB-223 373/2 PC A07/MF A01
Mississippi State Univ., State College. Water Resources Research Inst.
A Study of Managerial Practices in Rural Water Systems
Charles P. Cartee, and D. C. Williams, Jr. Jul 73, 133p* OWRR-B-008-MISS(1)

Keywords: *Water supply, Management methods, Rural areas, Water services, Systems engineering, Standards, Growth, Requirements, Surveys, Inequalities, Operations, Maintenance, Operators(Personnel), Management analysis, Mississippi.

The rural community water system program in Mississippi has grown until the systems total is now over 580, the second largest of all the states. Due to the rapid growth and changing demands and standards, a study of managerial practices was deemed appropriate. The emphasis is directed toward deficiencies in management. Also of concern were the relations of operating and maintenance costs per user to system size.

PB-223 510/9 PC A06/MF A01
North Central Forest Experiment Station, St. Paul, Minn.
Black Walnut as a Crop. Black Walnut Symposium, Carbondale, Illinois, August 14-15, 1973
Forest service general technical rept. (Final)
Jul 73, 120p* Rept no. FSGTR-NC-4

Keywords: Nut trees, Research, Walnuts, Cultivation, Walnut wood, Plant genetics, Plant growth, Economic development, Marketing, *Wood products, Plant reproduction, Protection, Meetings, *Plants(Botany), Juglans migra, Silviculture.

The report contains 30 papers on black walnut presented at a symposium in Carbondale, Illinois, in August 1973. Subjects covered include black walnut resources, utilization, and marketing; silviculture; tree improvement; nut culture and production; protection; and economics.

PB-223 999/4 PC A02/MF A01
Kansas State Univ., Manhattan.

Improving Protein Quality of Millet, Sorghum, and Maize Diets by Supplementation
S. Pushpamma, D. B. Parrish, and C. W. Deyoe.
1972, 9p AID-664.06-P261
Contract AID/csd-1586
Pub. in Nutrition Reports International, v5 n2 p93-100 Feb 72. Also pub. as Kansas State Univ., Manhattan. Dept. of Biochemistry Contrib-134, and Dept. of Grain Science and Industry Contrib-776.

Keywords: Nutritive value, Proteins, Food supplements, Millet, Sorghum, Maize, Diets, Fish protein concentrates, Milk, Vegetable proteins, Soybeans, *Food fortification.

Nutritive value of the protein of millets (Bajra and Ragi), sorghum, and maize was studied by amino acid analyses, by growth of rats and calculations of PER using diets containing the grains, unsupplemented or supplemented with lysine, tryptophan, or four protein concentrates. Ragi protein was highest in essential amino acids (EAA) except leucine, and compared to the FAO reference pattern, no amino acid in Ragi was limiting except lysine was marginal. Bajra protein was deficient in lysine; sorghum and maize were deficient in three or more amino acids. On several protein-quality scores, Ragi ranked first and Bajra second; both ranked considerably higher than sorghum or maize. Among unsupplemented diets, Bajra caused greatest weight gain in rats and had the highest PER. Supplementing Bajra and Ragi diets with lysine increased both gains and PER. Lysine improved sorghum and tryptophan improved maize diets; together lysine and tryptophan markedly improved both diets. Fish protein concentrate was the most effective supplement with sorghum and Ragi, dried milk with maize, and isolated soybean protein with Bajra.

PB-224 025/7 PC A15/MF A01
Agency for International Development, Washington, DC.
A.I.D. Spring Review of Small Farmer Credit. Volume I. Small Farmer Credit in Mexico and Central America
Country papers.
Feb 73, 341p Rept nos. AID-332.71-A265, SR-101
See also Volume 2, PB-224 026.

Keywords: Credit, Farms, *Mexico, *Central America, Finance, Financing, Latin America, *Agricultural economics, Small business, Loans.

The volume consists of five separate reports describing the program characteristics, evaluation and role of technical assistance regarding farm credit as it is institutionalized and practiced in four countries of Central America. The titles and authors of these reports are as follows: 'Guarantee and Development Fund for Agriculture, Livestock and Poultry' by Jorge Uriza Salgado; 'Credit Among Small Farmers--The Case of the Puebla Project of Mexico' by Heliodoro Diaz Cisneros; 'The Supervised Credit Program in El Salvadore--1961 to the Present' by Richardo A. Vasquez, Gustavo Solis and David E. Weisenborn; 'The National Bank of Honduras' by Reinaldo W. Santos; 'The Rural Credit Program of the National Bank of Nicaragua--Report on Credit to the Small Farmer in Nicaragua' by Carlos Rene Ramirez.

PB-224 044/8 PC A06/MF A01
Agency for International Development, Washington, DC.
A.I.D. Spring Review of Small Farmer Credit. Volume XX. Small Farmer Credit-Summary Papers
Jun 73, 108p Rept nos. AID-332.71-A265s, SR-120
See also Volume 19, PB-224 043.

Keywords: Credit, Farms, Finance, Financing, *Agricultural economics, Small business, Loans.

For the Review, AID was able during the period June 1972 thru January 1973 to assemble a large number of comparable case studies drawn from different parts of the world, to analyze them, and to report on the lessons of experience. The research focused on three principal themes: The role of institutional credit in small farmer development; the major institutional alternatives for delivering small farmer credit; and certain policy issues, such as interest rates, that appear to be critical to the success of these programs. The tentative conclusions drawn from the research were refined during a series of ten field workshops in the spring of 1973 and are presented in summary form in this volume. The entire evaluation is limited by the fact that credit is only one of the factors in a small farmer development strategy, and, though the study found a handle on the broader subject, it cannot, in itself, recommend an overall solution to the small farmer problems.

PB-224 222/0 PC A05/MF A01
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
Capital Formation of the Ecuadorian Frontier: A Study of Human Investment and Modernization in the Riobambenos Cooperative
Peter M. Gladhart. Apr 72, 78p A.E Res-72-5, AID-EC-3338.1-G542
Contract AID/csd-2823

Keywords: *Ecuador, *Agricultural economics, Food supply, Farms, Income, Production, *Cooperatives.

The agricultural production activities of spontaneous settlers is described in detail, with special focus upon the determinants of family income and investment and rate of capital formation. The cooperative Riobambenos del Rio Chilimpe was selected for extensive study. Production processes and family income structure was analyzed for 22 farmers for calendar year 1967. The most important sources of income for the majority of farmers were, in order: crop sales, livestock sales, and timber sales. 59% of family receipts for the average farmer were provided by crop sales. The most important crop was plantain. Important developmental benefits of land settlement in Santo Domingo de Los Colorados include: economic integration, redistribution of income, and creation of a modern agricultural sector.

PB-224 224/6 Reprint
Instituto de Nutricion de Centro America y Panama, Guatemala City.
Un Modelo de Fortificacion del Maiz con Harina de Soya, Lisina y Otros Nutrimentos, en una Comunidad Rural de Bajo Nivel Socioeconomico (From the Study: A Model for Corn Fortification with Soy Bean Flour, Lysine and Other Nutrients in a Low Socioeconomic Rural Community)
Leonardo j. Mata. Mar 72, 18p AID-GT-613.28-M425a
Contract AID/csd-3357
Text in Spanish.
Pub. in Memorias de la Conferencio sabre el Mejoramiento Nutricional del Maiz, Instituto de Nutricion de Centro America y Panama (INCAP) 1972. Text in Spanish.

Keywords: *Food fortification, *Nutrition, *Soybeans.

A long term prospective study in a highland community where corn provides 70% of proteins and calories, revealed that: (a) 40% of babies have low birth weight; (b) most infants exhibit physical growth retardation; (c) infant mortality is very high; and (d) certain infectious diseases have a greater severity and longer duration than usual. In this village, 'nixtamal' (lime-cooked corn) is ground in mechanical mills; a supplement is added to nixtamal during milling. The supplement provides 7.82 percent soy bean flour, 0.1 percent lysine, and 0.08 percent of a mixture of vitamins A, B sub 1, B sub 2, and niacin, and iron. Field trials showed that the supplement does not effect the taste of the tortillas. Effects of the intervention could be noticeable in fetal growth, weight curves in the first year of life, infant mortality, and duration of disease. It is expected that the nutritional intervention will have a measurable beneficial effect on the parameters studied when the first data analysis is made in 1974.

PB-224 225/3 PC A02/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Progress Report on Fisheries Development in Northeastern Brazil. I. Aquaculture
N. B. Jeffrey. Aug 72, 11p AID-BR-639.20981-J46
Contract AID/csd-2270

Keywords: Fresh water fishes, Food processing, Aquatic biology, Aquaculture, *Brazil, Research projects, Marketing, Proteins, Management, *Fisheries.

The United States Agency for International Development has been providing assistance to the Government of Brazil in freshwater fisheries since 1966. The project goal established for this assistance is to create a freshwater fisheries group capable of planning and conducting practical research programs in the fields of food technology, fish culture, and fisheries biology. The purpose is to increase fish production in Northeast Brazil through proper management of the freshwater fisheries, improvement of fish processing methods, and the introduction of intensive fishculture techniques. Once these purposes are achieved, general well-being of the people can be improved by increasing the amount of protein available for human consumption and by creating opportunities for capital investment. This report summarizes and evaluates USAID assistance in fisheries biology, and provides a brief description of the Drought Polygon of Northeastern Brazil, the reservoir fisheries, the marketing systems and sections on past and present strategy, project status, and recommendations for future action.

PB-224 227/9 PC A04/MF A01
Agency for International Development, Washington, DC.
Oil Seed Production in the Tropics and Sub-Tropics
Technical series paper no. 6.
Feb 72, 70p Rept no. AID-633.85-A265

Keywords: Oilseed crops, Tropical regions, Soybean plants, Cotton plants, Plant ecology, Cultivation, Acclimatization, Production, Exports, Food preparation, Sesamo oil, Cottonseed oils, Safflower oil, Soybean oil, *Vegetable oils.

The study is intended to survey the importance of annual (vegetable) oilseed crops in developing countries and to provide certain basic information as to the characteristics and utility of the more important types. The species considered included groundnuts, sesame, sunflower, safflower, cottonseed, soybeans, and castorbeans. This study deals with each of the seven annual oil seed crops, as to their respective plant characteristics; ecological adaptation; uses; cultural practices for higher levels of productivity; world production centers; and world trade in the oil seeds, their extracted oils, and the cake or meal derived from extraction of the oil.

PB-224 268/7 PC A06/MF A01
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations.
Selection and Operation of Small Wastewater Treatment Facilities - Training Manual
Charles E. Sponagle. Apr 73, 117p* Rept no. EPA-430/1-73-005

Keywords: *Sewage treatment, Manuals, Education, Packaged sewage treatment, *Septic tanks, Industrial plants, Water pollution, Maintenance, Sewage treatment plants, Physical chemical treatment.

The training manual consists of a series of outlines used as a base of instruction. Subjects covered include characteristics of the water environment; pollution from municipal and industrial sources; methods of wastewater treatment; consideration of specific types of small treatment plants, including septic tanks, package plants, and lagoons; and control tests, sampling, and inspections associated with maintaining effective treatment plant operation.

PB-224 292/3 PC A03/MF A01
Cornell Univ., Ithaca, N.Y. Dept. of Agricultural Economics.
Rural Works and Employment: Description and Preliminary Analysis of a Land Army Project in Mysore State, India
W. Graeme Donovan. Apr 73, 28p AID-IN-331.763-D687
Contract AID/csd-2805

Keywords: *Employment, *India.

Under the Crash Scheme for Rural Employment, the most recent Central Government program of rural works in India, numerous projects have been set up throughout the country. This paper contains a description and analysis of one such project in Mysore State.

PB-224 365/7 PC A02/MF A01
Auburn Univ., Ala. International Center for Aquaculture.
Relationship of the Thai Fish Culture Program to Production of Fish in the Lower Mekong Area
H. S. Swingle. Feb 72, 17p AID-TH-639.3-S978

Contract AID/csd-2270
Presented at the Seadag Mekong Development Panel Seminar, held at Santa Barbara, Calif., on 3-5 Feb 72.

Keywords: Aquaculture, *Thailand, *Fisheries, Irrigation, Ponds, Ditches, Feeding habits, Feeding stuffs, Production, South Vietnam.

Research by the Thailand Department of Fisheries Stations and Research Units has developed cultures for use in hatcheries, rice fields, ponds, cages, pens and irrigation ditches that can be utilized in rapid expansion of fish production as irrigation water is made widely available from Mekong impoundments. They have also determined the feeding habits of many indigenous species to facilitate selection of species capable of utilizing the various types of natural fish-food organisms in various habitants.

PB-224 400/2 MF **A01**
National Research Council, Washington, DC. Committee on Animal Health.
Control of Rabies
May 73, 33p
International Standard Book No. 0-309-02124-3 Prepared by National Academy of Sciences, Washington, DC.
Paper copy available from National Academy of Sciences, Printing and Publishing Office. 2101 Constiution Ave., Wash. DC.

Keywords: Rabies, Prophylaxis, Vaccines, Wildlife, Rabies, Infectious diseases, Nervous system disorders, Viral diseases, Convulsive disorders, Pathology, Immunity, Public health, Veterinary medicine, Mammals, *Animal diseases, Epidemiology, Arboviruses, Rabies virus, *Diseases, Rhabdovirus, Neurotropic viruses.

The report deals with the pathogenesis of rabies; virus-wildlife interactions; vaccines and regulatory aspects; and control programs for the four classes of hosts involved in rabies--domestic pets, wild animals, domestic livestock, and man. This valuable guide provides practical, current, and concise information on all aspects of rabies control. A compendium of animal rabies vaccines is presented at the conclusion of the report that includes information on live and inactive vaccines licensed in the United States. Specific information provided includes the name of each vaccine, companies licensed to sell these vaccines, suggested regimen recommended, and duration of immunity.

PB-224 411/9 PC **A02**/MF **A01**
Puerto Rico Planning Board, Santurce.
Experimental Industrialized Housing Program. Model H-620 - Single Family Dwelling
Final rept. on phase 2.
30 Sep 72, 19p Rept no. PRPB-71-02
Prepared by Puerto Rico Urban Renewal and Housing Administration.

Keywords: Residential buildings, *Reinforced concrete, Prefabrication, *Houses, Construction, Puerto Rico, Socioeconomic status, Cost analysis, *Asbestos, Roofs, Wooden structures, Floors, Walls, Project planning, Low cost housing, Detached dwellings, Low income housing.

The report contains a description and plans for a reinforced concrete house with asbestos cement roof, to be prefabricated by industrialized methods. A detailed cost analysis is included.

PB-224 427/5 MF **A01**
National Academy of Sciences, Washington, DC.
Alternative Sources of Protein for Animal Production
31 Jul 72, 184p*
Internal Standard Book No. 0-309-02114-6 Proceedings of a Symposium. Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
Paper copy available from National Academy of Science Printing and Publishing, 2101 Constitution Ave., Washington, DC.

Keywords: Feeding stuffs, Proteins, Livestock, Meetings, Grains(Food), Forage corps, Food processing, Meat, Blood, Oilseeds, Fish protein concentrates, Agricultural wastes, Industrial wastes, Quality, Utilization, Evaluation, Animal nutrition, *Poultry, *Animal husbandry, Animal wastes.

For the benefit of livestock and poultry producers, feed manufacturers and scientists and researchers in animal husbandry, this report reviews potential sources of protein and considers ways to increase the quantity and improve the biological value of protein for animal production. Some of the symposium papers presented in the report explore measures for enhancing protein supplies from known proteinaceous feeds, while others identify and evaluate some new or under-utilized sources. In discussions of known sources of protein, the report considers ways to improve the quantity and quality of protein in cereal grain, separate protein from fiber in forage crops, improve the processing and utilization of animal by-product proteins, increase production of oilseed protein, change utilization patterns. New sources of protein discussed include such less-utilized oilseeds as sunflower and sesame, the grain legumes, whole fish protein, single- cell protein from industrial wastes, and recycled animal wastes.

PB-224 506/6 PC **E03**/MF **A01**
Bureau of Sports Fisheries and Wildlife, Denver, CO. Denver Wildlife Research Center.
Chemical Control of Vampire Bats
G. Clay Mitchell, and Richard J. Burns. May 73, 82p
AID-599.4-M681
Grant PASA-RA(ID)-1-67
Prepared in cooperation with Instituto Nacional de Investigaciones Pecuarias, Secretaria de Agriculture y Ganaderia, Gobierno de Mexico.
Text in Spanish.

Keywords: Livestock, *Bats, *Pest control, Anticoagulants, Injections(Medicine), Blood, Poisons, Vampire bats, Diphenadione.

Two different chemical methods for reducing populations of vampire bat populations are described. Both methods are based on an anticoagulant, diphenadione. The chemical is either injected into the rumen of cattle or applied directly to the back of vampire bats captured near livestock. The blood of treated cattle is poisonous to vampire bats for about three nights following treatment. Vampire bats with the anticoagulant applied to their backs return to their roost where the chemical is passed from one to several others by contact and mutual grooming. One treated vampire bat can carry sufficient chemical to poison 20 other vampire bats. (Available in English and Spanish)

PB-224 749/2 PC **A05**/MF **A01**
National Academy of Sciences, Washington, DC.
Mosquito Control. Some Perspectives for Developing Countries
Mar 73, 76p*
Contract AID/csd-2584
A report of an Ad Hoc Panel of the Advisory Committee on Technological Innovation, Office of the Foreign Secretary. Summaries in Spanish and French.

Keywords: Culicidae, *Pest control, Developing countries, Insect control, Nematoda, Fungi, Larvae, Parasitology, Plants(Botany), Growth regulators, Fishes, Protozoa, Insect vectors, Invertebrates, *Mosquitoes, *Insects, Mosquito control, Biological insect control.

The panel of Perspectives in Mosquito-Control Methods Suitable for Developing Countries met in Washington, D.C. four times during 1972 and 1973. The panel identified almost fifty topics in biological, chemical, or environmental control of mosquitoes that are not receiving the research attention they warrant. The panel chose nine topics that were promising for use in developing countries. These topics are: larvivorous fish, invertebrate predators, genetic control, parasitic nematodes, parasitic protozoans, parasitic fungi, pathogenic bacteria, juvenile hormone mimics, and larvicidal plants. Each topic covered in the report includes a list of selected readings, and source of research. Panel members are listed.

PB-225 034/8 PC **A05**/MF **A01**
Washington Environmental Research Center, DC. Environmental Studies Div.
Quality of Life Indicators. A Review of State-of-the-Art and Guidelines Derived to Assist in Developing Environmental Indicators
Martin W. Brossman. Dec 72, 88p* Rept no. 62062

Keywords: Environments, Characteristics, Economic conditions, Social organization, Development, Analyzing, Classifications, *Environmental surveys, Qualtiy of life, Economic indicators, Social indicators, Environmental indicators,

The report provides a review and assessment of the state-of-the-art of quality of life indicators. Economic indicators, social indicators, environmental indicators, and an all encompassing quality of life indicator are discussed. The report traces the history of each category of indicator development, discusses the difficulties found and suggests guidelines for future indicator development.

PB-225 129/6 PC **A03**/MF **A01**
National Academy of Sciences, Washington, DC.
Research Management and Technical Entrepreneurship: A. U.S. Role in Improving Skills in Developing Countries
An Hoc Advisory Panel.
1973, 50p
Contract AID/csd-2584
Library of Congress Catalog Card No. 73-12294.

Keywords: Industrial engineering, Developing countries, Transfer of technology, Management planning, Research management, Research, Reviews, Quality control, Production control, Improvement, Economic forecasting, Management training, Industrial relations, Problem solving, Project planning, United States, *Training, Less developed countries, *Research and development.

The Ad Hoc Advisory Panel on Research Management and Technical Entrepreneurship in LDCs reviewed the gamut of technical functions involved in improving industrial operations in LDCs. It examined research management as a part of technical management--from quality and production control, through product and process improvement, to the development of indigenous technology or assimilation of advanced technology from abroad, and finally to project or process evaluation. The report argues for an experimental approach to try out and perfect avenues of training, in concert with other countries similarly engaged, and to the fullest extent possible within the developing countries themselves.

PB-225 652/7 PC **A02**/MF **A01**
Minnesota Univ., St. Pr ' Dept. of Agricultural and Applied Economics.
The Economics of Olive and Oilseeds in the Mediterranean Region. (NEA-633.85-A478)
Staff paper
Osama A. Al-Zand. Jan 73, 22p P73-5, AID-NEA-633.85-A478
Contract AID/csd-2815

Keywords: *Vegetable oils, *Agricultural economics, Demand economics, Oilseed crops, Imports, Exports, Market research, *Mediterrean Sea.

After a brief review of the region's major economic indicators and the nature of the commodities under consideration, the paper is focused on the discussion of the economic characteristics of edible oils and oilseeds in comparison with olive oil, the demand for edible oils in the Mediterranean region, and the future outlook for oils and oilseeds in this region. The activities and policies of both importing and exporting countries of oils and oilseeds to foresee and accomodate future market developments should be rather decisive in shaping the size of trade and trade patterns in these products within the region.

PB-225 700/4 PC **E04**/MF **A01**
West Virginia Univ., Morgantown. Engineering Experiment Station.
Proceedings of the Annual Symposium on Reduction of Costs in Hand-Operated Glass Plants (3rd), May 17-19 1972 held at the West Virginia University, Clarksburg
Richard P. Smith. Nov 73, 99p* Rept no. Bull-107
Pub. as West Virginia Univ. Bull. Ser-74, no. 1-5.

Keywords: *Glass, Cost engineering, Symposia, Alkali glass, Glassware, Manufacturing, Metal coatings, Molding techniques, Personnel development.

Contents:
- Lithia boosting of soda-lime glasses;
- Plasmacoating - a new approach to metallic application in glass decorating;
- A new look at an old art -- mixing;

Mold polishing revolution to the glass industry;
Heat/energy recovery for the glass industry;
Current information on education relative to hand operated glass plants in Scandinavia, Europe and some Communist countries;
and The use of cast refractories in small glass works.

PB-225 787/1 PC A02/MF$3.00
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Drying and Processing Research at IRRI. (633.18-M266)
Seminar paper
A. S. Manalo, J. R. Arboleda, and Amir U. Khan. 12 Aug 72, 25p AID-633.18-M266
Contract AID/csd-2541

Keywords: Crop driers, Processing equipment, Cost effectiveness, Farms, Rice plants, *Southeast Asia, Small farms, *Rice, *Agriculture.

The development of a low-cost farm drying and processing equipment that would be suitable for use and manufacture in the developing countries is of urgent neccessity. Such equipment could be used by the medium-size farm holdings of 2 to 10 hectares which contribute a large portion of the land under paddy cultivation in Southeast Asia. Very few attempts have been made by private manufacturers on the development of small drying and processing equipment. Research and development on low-cost drying and processing equipment for small-scale operation is one of the important areas of activities at the Agricultural Engineering department of the Institute.

PB-225 789/7 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Economic Aspects of Hand Tractor Ownership and Operation. (RP-631.3-064)
Seminar paper
Bert Orcino. Dec 72, 33p AID-RP-631.3-064
Contract AID/csd-2541
Seminar on Farm Mechanization in Southeast Asia, Penang and Alor Star, Malaysia, 27 Nov-2 Dec 72.

Keywords: *Agricultural machinery, *Philippines.

The report discusses the economics of hand tractor ownership and operation. The objectives are to analyze input-output data on various types of hand tractors and to define the relationship between tractor use and costs via average cost curves. The first section contains a technical description of hand tractors used on Philippine rice farms. Information on why the tractors were bought and what criteria were used in choosing them are given in the second section. The third section is devoted to a comparative economic evaluation of power tillers and the fourth is an attempt to establish the conditions under which hand tractor repayments can be made. The last section examines the impact of devaluation on hand tractor use.

PB-225 798/8 PC A03/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Improving Internal Marketing Systems as Part of National Development Programs. (380.141-R573)
Conference paper
Harold M. Riley. May 72, 30p Staff Paper Ser-72-10, AID 380.141-R573
Contract AID/csd-2826

Keywords: *Agriculture, *Marketing.

The information base and the views expressed in this paper have been derived from a marketing research and development project (LAMP - Latin American Marketing Planning Center) through which a Michigan State University group has carried out studies in Puerto Rico, Northeast Brazil, Bolivia and Colombia in collaboration with local governments and their related agencies. The material being presented in this paper represents an accumulation of experience over a period of approximately seven years by the Michigan State University group. The primary purpose of this effort has been to conduct diagnostic studies of internal marketing systems linking large urban centers with their rural supply area and to formulate recommendations for marketing improvements. This activity has centered upon agricultural marketing broadly defined to include not only agricultural product marketing but also the distribution of farm inputs and consumer goods.

PB-225 800/2 PC A03/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Designing Agricultural Marketing Systems in Developing Countries. (380.141-S825)
James D. Shaffer. Feb 72, 32p Staff Paper Ser-72-3, AID-380.141-S825
Contract AID/csd-2826
Presented at the Agricultural Marketing Conference held in Kathmandu (Nepal), on 21-24 Feb 72.

Keywords: *Marketing, Agricultural products, Agricultural economics, Distribution systems, Food industry, Productivity, *Agriculture.

The purpose of this paper is to discuss the design of improved agricultural marketing systems as a means of stimulating economic development. This implies two propositions: (1) that the marketing system can be an active element in the development process and (2) that high performance marketing systems do not develop automatically in response to the needs of a particular situation. Marketing is often neglected in development planning because one or the other or both of these propositions are implicitly rejected. The theme of this paper has been that improved organization and coordination of food production-distribution systems is critical in the effective transformation from a traditional agricultural economy with low productivity to a scientific industrial one with high productivity.

PB-225 801/0 PC A03/MF A01
North Carolina Agricultural Experiment Station., Raleigh.
Nitrogen Fertilization and Management in Tropical Rice. (633.18-S211)
Technical bulletin
Pedro A. Sanchez. Nov 72, 33p TB-213, AID-633.18-S211
Contract AID/csd-2806

Keywords: Rice plants, Nitrogen, *Fertilizers, Tropical regions, Oxidation reduction reactions, Flooding, Soil properties, *Rice.

Rice is the main food crop in the tropics. It is the only important crop capable of growing in flooded soils because of its ability to oxide its rhizosphere. Rice responds almost universally to nitrogen fertilization. Nitrogen reactions are markedly affected by oxidation-reduction status of the soil, which largely depends on water management and soil physical conditions. Temporary flooding in most tropical areas causes loss of native or applied nitrogen. The responses of rice to nitrogen are minimal when tall varieties are used. In contrast, the responses are large and economical when higher rates are applied to short-statured varieties. Nitrogen recommendations for flooded rice are based on soil properties, plant type, solar energy, temperature, water management, and spacing.

PB-225 803/6 PC A07/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Establishing Design Criteria for Improved Rice Milling Technologies. (RP-633.18-D855)
Seminar rept.
Bart Duff, and Ida Estioko. Aug 72, 130p AID-RP-633.18-D855
Contract AID/csd-2541

Keywords: Grinding mills, *Rice, Philippines, Upgrading, Cost analysis, Design criteria, Improvement, *Agricultural machinery.

The paper addresses itself specifically to the problems of modernizing and upgrading the rice milling industry. More precisely, it is an attempt to critically assess the efficiency and economics of existing rice milling technologies. The objectives are to determine the potential for technical improvements in existing systems and, where feasible, the efficacy of initiating activities to design and develop new technologies which will increase efficiency and reduce losses. The analysis is confined principally to milling equipment and does not include an evaluation of issues relating to storage or drying.

PB-225 933/1 PC A03/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Three Rural Development Models for Small Farm Agricultural Areas in Low Income Nations--Some Results from Comilla, Bangladesh. (BG-301.34095492-S845
Staff paper
Robert D. Stevens. Jun 72, 29p AID-BG-301.34095492-S845
Contract AID/csd-2826

Keywords: *Agricultural cooperatives, *Bangladesh.

The paper provides an outline and analysis of three effective models of programs for small farm agricultural areas based upon ten years experience in Bangladesh. The models are for (1) effective agricultural cooperatives, (2) the improvement of rural government, and (3) for a social science institution which conducts pilot operations, training, and research in rural development. In a broader social science framework, development programs require analysis in the framework of cultural and economic change. The role of models such as the three analyzed here is to provide ways to accelerate change at a productive rate toward desired goals.

PB-225 935/6 PC A18/MF A01
Rivkin/Carson, Inc., Washington, DC.
Economic Development and Water Resource Investment
Aug 73, 416p*
Contract DI-14-06-D-7336

Keywords: Economic analysis, Regional planning, *Water resources, Growth, Measurement, Investments, Factor analysis, Benefit cost analysis, Interactions, Regions, Requirements, Community relations, Concepts, Demography.

Innovative approaches are explored for measuring and identifying benefits to area economic development through water resource improvements. A new approach was developed and tested, and some significant methodological conclusions were reached. General conclusions of the analysis relating water resource projects and other public expenditures to economic development are: (1) water-related investments affect both the level of economic activity and its growth; (2) water resource developments viewed as factors of production can be examined for their substitution relationships with non-water production factors; and (3) the effect of water on economic growth depends on (a) the state of the regional economy in which the investment is made, and (b) other non-water investments.

PB-225 946/3 PC A05/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Rural Development Programs for Adaptation from Comilla, Bangladesh, (BG-301.34095492-S845a)
Robert D. Stevens. Jun 72, 80p AID-BG-301.34095492-S845a
Contract AID/csd-2826

Keywords: *Agricultural cooperatives, *Bangladesh.

Introductory material and background on the Academy for Rural Development in Comilla and the methods used in developing rural programs are presented first. The paper then briefly describes essential elements of six rural development programs organized at Comilla. Detailed analysis follows of two of these programs: Improvements in rural government, and development of new agricultural cooperatives. Conclusions, about the potential of these programs for adaptation in other nations are presented in the final section.

PB-225 956/2 PC A03/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
The Effectiveness and Financial Stability of the Comilla Agricultural Cooperative Credit System for Small Farmers, (BG-332.71-S845)
Robert D. Stevens, and Anwarul Hoque. Apr 71, 29p Staff Paper Ser-72-8, AID BG-332.71-S845
Contract AID/csd-2826
Presented at a Workshop on 'Agricultural Credit for Small Farmers in Less Developed Countries', held in Arlington, Va., on 6-7 Apr 71.

Keywords: Credit, Financial management, Farms, Finance, Agriculture, Financing, *Agricultural economics, *Agricultural cooperatives, *Bangladesh, Cooperatives, Small business, Loans.

After some introductory remarks providing a framework within which this analysis is made, the paper focuses in Part II on the effectiveness of the Comilla Cooperative System in providing credit to small farmers. The third part of the paper examines the operating procedures and economic stability of the Comilla Agricultural Cooperatives Federation. In the fourth part, some conclusions and discussion of special issues are offered.

PB-226 015/6 PC E08/MF A01
American Institutes for Research, Pittsburgh, PA.
Ability Testing in Developing Countries. A Handbook of Principles and Techniques. (371.264-S411a)
Handbook 1960-1968
Paul A. Schwarz, and Robert E. Krug. 1972, 257p
AID-371.264-S411a
Contract AID/csd-798

Keywords: *Management techniques.

An eight-year program of research and development with the objective of devising techniques of aptitude testing that could be applied in cultures in which standard ability tests are not fully effective and to assist in the application of these techniques to human resource development program was conducted under an AID-supported program. The final phase of the project developed and presented the results in the form of this handbook.

PB-226 478/6 PC A06/MF A01
Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.
Individual Home Aerobic Wastewater Treatment Systems
Master's thesis
Robert Norman McBride. 1972, 121p* OWRR-A-021-COLO(2)

Keywords: Houses, *Sewage treatment, Aerobic processes, Statistical data, Design, Biochemical oxygen demand, Septic tanks, Evaluation, Tests, Theses, Residential buildings.

A system that has an economic advantage over septic tanks under certain soil conditions is the aerobic system. The use of aerobic systems is described including unit functions, types of units available, and problems and recommendations for improvement. Aerobic units under experimental conditions were observed to produce a better effluent than a septic tank. However, the performance as claimed by the manufacturers, could be misleading to homeowners. The results of tests run on the units located in the field show that the units are meeting the manufacturers standards about 20% of the time. These units only average about a 44% reduction in BOD. This is assuming an incoming BOD of 250 mg/liter. In some cases the tests showed an influent BOD greater than this.

PB-226 621/1 PC A08/MF A01
Cornell Univ., Ithaca, N.Y. Program on Policies for Science and Technology in Developing Nations.
The Natural Resource Potential for Regional Development of Limon Province: A Preliminary Survey
Oct 73, 162p
Contract AID/csd-3391

Keywords: *Natural resources, *Costa Rica, Economic development, Economic surveys, Regional planning, Industrial relations, Agriculture, Transportation, Livestock, Wildlife, Developing countries, Limon Province(Costa Rica), Tourism.

The study is part of a larger study to understand the appropriate role of science and technology in the development of a small country like Costa Rica. The Limon survey may be described as a broad brush survey of the natural resources existing in the region. This effort comprised gathering data relevant to the survey, evaluating the data, and suggesting studies for formulating policies for regional development. The study was made by a team from Cornell University in cooperation with Costa Rican consultants.

PB-227 053/6 PC A02/MF A01
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Diagnosis and Treatment of Poisoning by Pesticides
1974, 16p
Report on Project Safeguard: Safe Pesticide Practices.

Keywords: Toxic diseases, *Pesticides, Diagnosis, Therapy, Drug therapy, Antidotes, *Diseases.

With the DDT ban, effective January 1, 1973, the use of a variety of other chemicals must be increased to substitute for DDT in the control of insects. Replacement chemicals will probably include among others: organophosphates; carbamates; chlorinated hydrocarbons; and botanicals. Chemicals replacing DDT will be less persistent in the environment than DDT. Some replacement chemicals will be more acutely toxic to man and, therefore, will present greater potential hazards. An intensive short-term educational program, Project Safeguard, is underway to train the farmer in the safe use of these replacement chemicals, and this program should minimize the hazards from improper use. The potential still exists, however, for an increased incidence of toxic exposure and resulting clinical illness, in which accurate diagnosis and prompt treatment could mean the difference between life and death.

PB-227 472/8 PC A06/MF A01
Auburn Univ., Ala. Water Resources Research Inst.
Social Accounting Approaches to Water Resource Use in Economic Development
Research rept.
Donald R. Street. Aug 72, 114p OWRR-B-029-ALA(3)
Prepared in cooperation with Auburn Univ., Ala. School of Business Research Series 3.

Keywords: *Water resources, Economic development, Economic analysis, Economic models, Water pollution, Fisheries, Regional planning, Hydroelectric power generation, Alabama, Mercury(Metal), Plant location, Thermal pollution, Input output analysis.

This collection of articles emphasizes the value of determining the costs associated with water-borne externalities. Pecuniary, technical, marginal and inframarginal externalities are defined and their effects on societies' production possibilities are examined. A survey was made to determine the loss of commercial fishing income arising from a fishing ban on an Alabama lake caused by mercury pollution. Total income loss to fishermen was mitigated by shifting their resources to other uses; as a result, it appears that only 15 commerical fishermen suffered income losses. The effect of production, consumption and disposal decisions on level and form of residuals was also examined. The modeling effort illustrates the flow of residuals and costs arising from power generation from either coal or nuclear fuel. The effect of water quality on regional growth was examined using an input-output model. A decrease in usable water was traced to show its composite effect on income, consumption, and governmental expenditures and revenues.

PB-227 591/5 PC A04/MF A01
Bureau of Labor Statistics, Washington, DC.
Woodworking. Circular-Saw Accidents
Final rept. 1951-52.
Jan 56, 74p Rept no. BLS-Bull-1190
Also available in set of 56 reports as PB-243 125-SET, PC E99/MF E99.

Keywords: *Sawmills, Industrial accidents, Personnel, Sawing, *Woodworking, Injuries, Safety engineering, Industrial hygiene, Statistical data, Statistical analysis, Occupational safety and health.

The report contains the results of a study of over 1,200 accidents which involved circular saws. Portable circular saws and large circular saws used in sawmills were excluded. State safety inspectors investigated any accident within the scope of the study which they found in the course of performance of their regular duties. Only accidents which occurred during 1951 or 1952 were included. Information about the number of injuries by nature of injury, part of body injured, agency (source) of injury, type of accident, hazardous condition, unsafe act, and activity of injured (feeding, off bearing, etc.) is presented. Descriptions of 22 typical accidents with recommendations for preventing them are included.

PB-227 616/0 PC A11/MF A01
Southern Illinois Univ., Carbondale. Dept. of Design.
Simplified Housing Construction Systems for Rural Poor Families
Final rept.
J. Michael DeRienzo. Jan 73, 241p* Rept no. JMDCONS-73-1

Keywords: Residential buildings, Construction, Manuals, Economic factors, Rural areas, Socioeconomic status, Construction materials, Systems engineering, Structural design, Components, Methodology, Construction costs, Illinois, *Houses, *Building materials, Low cost housing.

The volume is designed to familiarize the groups of underprivileged rural inhabitants with simple construction techniques, new materials available, and the exploitation of common but often unrecognized building materials. Use of the latest technology, along with low cost or no cost materials and methods will permit an owner-builder to assemble a rationalized living unit. Emphasis is on construction techniques which require little skill and time to accomplish.

PB-228 100/4 PC A09/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
World Desertification: Cause and Effect. A Literature Review and Annotated Bibliography
Wade C. Sherbrooke, and Patricia Paylore. 1973, 176p* Arid Lands Resource-IP-3, OWRR-W-141(3729)(3)
Contract DI-14-31-0001-3729

Keywords: *Deserts, *Land use, Bibliographies, *Arid land, Climatology, *Drought, Precipitation(Meteorology), Land reclamation, Soil erosion, Reforestation, Agriculture, Grazing land, Reviews.

An annotated bibliography is presented of 252 references, computer-produced from the University of Arizona's Arid Lands Information System (ALIS), with accompanying text that reviews briefly both cause and effect of world desertification. Causes fall into two categories: long-term (in the geologic sense) climatic change as supported by meteorological, archaeological, gemorphological, vegetational, palynological, and dendrochronological evidence in the literature; and those activities of man's historic occupance of arid and semiarid regions that have contributed to degeneration of marginal lands: agricultural and irrigation practices, grazing, fire, nomadism, and sand stablization and reforestation. Beyond these two categories, there is a third: climatic fluctuation - - short-term weather patterns induced by uncertain rainfall and followed by cyclic droughts from which marginal areas may not recover is subjected to continued attempts at intensive use that cannot be sustained by a dry year or a succession of dry years. Portions of this document are not fully legible.

PB-228 148/3 PC A15/MF A01
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations.
Biological Treatment Technology (162)
Final rept.
F. J. Ludzack. Dec 73, 326p* Rept no. EPA-430/1-73-017

Keywords: *Sewage treatment, Manuals, Activated sludge process, Nutrients, Biochemical oxygen demand, Trickling filtration, Chlorination, Sludge disposal.

This manual includes a collection of instructional materials to assist the student to upgrade performance of biological treatment facilities. Information gathering techniques related to wastewater characteristics, concentrations, and loading are described. The influence of those data upon common treatment operations and correction of treatability difficulties are considered. Operational control to maximize the performance of existing facilities are discussed along with selection of add-on operations or design of new facilities to upgrade the treatment system to a performance compliance status.

PB-228 660/7 PC A04/MF A01
National Science Research Council of Guyana, Georgetown.

Some Prospects for Aquatic Weed Management in Guyana
17 Mar 73, 53p
Contract AID/csd-2584
Proceedings of Workshop on Aquatic Weed Management and Utilization Held in Georgetown (Guyana) 15-17 Mar 73. Prepared in cooperation with National Academy of Sciences, Washington, D.C.

Keywords: Aquatic weeds, *Guyana, Management, Utilization, Meetings, Aquatic biology, *Weed control, Vegetation, Herbicides, Chemical properties, Feeding stuffs, Additives, Soils, Bibliographies, *Aquatic plant control.

The report is aof a three-day workshop on the management and utilization of aquatic plants, to formulate recommendations for implementation by local authorities to (1) deal with the aquatic weed problem, particularly by utilizing the vegetation as a resource for products, such as animal feeds and soil additives and (2) develop outlines of integrated systems of aquatic weed management in Guyana using biological, physical, and chemical methods. A bibliography is included.

PB-229 181/3 PC E07/MF E07
New Mexico Univ., Albuquerque. Technology Application Center.
Waste Glass Utilization. Cumulative Volume
30 Jun 73, 222p* Rept no. TAC/WGS-74-301

Keywords: *Glass, Solid waste disposal, Reclamation, Aggregates, Paving, Foam, Grinding(Comminution), Crushing, Economics, Cement additives, Regulations, Abstracts, Symposia, Construction materials, *Waste recycling, Glass recycling.

Glass, as a by-product of the total recycling process, may soon be available in quantities sufficient not only for the manufacture of more glass, but for use in a wide variety of secondary products. These products may range from resurfacing materials which can be used under a greater variety of environmental conditions than asphalt, to glass wool and construction panels. To explore these new products, a 'Symposium on the Utilization of Waste Glass in Secondary Products' was held in Albuquerque, January 24-25, 1973. This document is an updated version of a state-of-the-art survey on the use of glass in secondary products, first prepared for the Symposium.

PB-229 209/2 PC A07/MF A01
Housing Assistance Council, Washington, DC.
An Analysis of Alternative Low-Income Rural Housing Systems
Final rept.
Gordon Cavanaugh. 29 Jun 73, 137p HUD-PDR-406

Keywords: Low income housing, Rural areas, Public housing projects, Surveys, Problem solving, Recommendations, Economic development districts, Housing agencies, Cost analysis, Defects, Systems analysis, Georgia, Colorado, South Carolina, Mississippi, Tennessee, Vermont, *Housing, Alternatives, Housing and urban development research.

The study examines several areas' housing authorities with regard to their public housing alternatives, and outlines the problems of small housing authorities. The report includes a design of a model agency and makes administrative and legislative recommendations.

PB-229 813/1 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Technological Opportunities for Tropical Forestry Development
Gordon D. Fox. Nov 73, 37p TA/OST-73-21, AID-ARC-634.0-F791

Keywords: Tropical woods, Technology transfer, Forest industry, Developing countries, Economic development, Forestry management, United States, Project planning, Utilization characteristics, Socioeconomic conditions, Political objectives, Institutional implications, Improvement, Criteria, *Forestry.

The paper is intended to identify the highest pay-off opportunities for the application of U.S. technology to the needs of developing countries for sound management and utilization of forest resources. Specifically the paper includes: (1) development of criteria for determining whether the political-socio-economic and institutional framework in an LDC is sufficiently favorable so that technological inputs will meaningfully improve forest utilization and management; (2) identification of appropriate countries; and (3) examination of a limited number of countries to illustrate how specific technological inputs can be matched with priority needs, and assessment of likely pay-offs.

PB-229 822/2 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Utilization of Tropical Forests. (A Review of the Forestry Literature in the Agency for International Development Reference Center)
Edward P. Cliff. Nov 73, 31p TA/OST-73-20, AID-ARC-634.98072-C637

Keywords: *Forestry, Developing countries, Reviews, Forest industry, Utilization characteristics, Land use, Trees, Problem solving, Recommendations, Reforestation, Project planning, Improvement, Economic development, Tropical woods, Africa, Latin America, Asia.

A review is made of forestry reports, publications, and other documents in the A.I.D. Reference Center to determine information available on utilization problems of secondary tree species in the developing countries. The time span covered is 27 years beginning in 1946. The report identifies forestry and land use problems, and examines recommended measures to upgrade forestry programs and improve utilization of unused and little used species.

PB-230 738/7 PC A03/MF A01
Forest Service, Washington, DC.
Factors Influencing the Utilization of Tropical Wood Species
Final rept.
Alan D. Freas, Martin Chudnoff, Robert C. Koeppen, and S. Blair Hutchison. Nov 73, 34p AID-ARC-634.9-F849
Grant PASA-TA(AJ)-2-73

Keywords: Tropical woods, Utilization, Constraints, Reviews, Factor analysis, Economic development, Developing countries, *Wood.

A.I.D. has been concerned, for an extended period of time, over the deleterious practice, in many tropical countries, of concentrating on a relatively limited number of species of tropical woods for exploitation. This investigative report, through review of available literature and on-the-ground consultation in selected countries, attempts to determine whether lack of knowledge of secondary species charactoristics is the primary deterrent to their increased use, or whether there are other equally and perhaps more important factors to be considered.

PB-231 006/8 PC A05/MF A01
Forest Products Lab., Madison, Wi
Development of the Tropical Wood Resource
Martin Chudnoff. Nov 73, 76p* TA/OST-73-23
Grant PASA-TA(AJ)-2-73

Keywords: Tropical woods, Forestry management, Reviews, Forest industry, Forest trees, Inventories, Utilization, Identifying, Statistical data, *Forestry, *Wood, Silviculture.

The report is one of a series on the subject of tropical forest utilization and management. The report covers the period 1950-1970 and focuses on a few selected countries with emphasis on definition of forests. It is based mostly on a library study and is divided into seven parts: Literature review; forest flora; commercial species; forest enumerations; silvicultural systems; characterization of primary species; and ten-year summary of roundwood removals, production, and trade.

PB-231 149/6 PC A07/MF A01
Massachusetts Univ., Amherst.
Proceedings of the Bioconversion Energy Research Conference Held at Massachusetts Univ., Amherst on 25-26 June 1973
26 Jun 73, 129p* NSF-RA/N-73-007
Grant NSF-GI-39215

Keywords: Solid waste disposal, Materials recovery, *Methane, Meetings, Digestion(Decomposition), Anaerobic processes, Refuse disposal, Garbage disposal, Sewage disposal, Manufactured gas, *Waste recycling, *Bioconversion, Methane digestion.

The two-day conference addressed itself to the question of biological conversion of waste and feedlot materials to methane. The specific objectives of the conference were: to exchange recent research information between engineers and scientists on research accomplishments and problems related to bioconversion studies; to contribute to the long-range planning of the funding agencies and research workers in the field; to provide improved communications between the research community and the users' groups; to identify the processes and technology important to the production of methane from waste and feed lot materials; to identify the important economic factors associated with bioconversion processes. These proceedings consist of the summary statements provided by each principal speaker at the conference, together with a transcript of essentially all of the tape-recorded question-and-answer period that followed each presentation.

PB-231 207/2 PC A04/MF A01
Florida Univ., Gainesville. Water Resources Research Center.
Processing, Chemical Composition and Nutritive Value of Aquatic Weeds
L. O. Bagnall R. L. Shirley, and J. F. Hentges. 16 Nov 73, 59p WRRC-Pub-25, W74-06502
Contract DI-14-31-0001-3209, DI-14-31-0001-3509

Keywords: *Aquatic weeds, Feeding stuffs, Water pollution control, Animal physiology, Acceptability, Chemical composition, Digestion(Biology), Composts, Cost estimates, Dewatering, Animal nutrition, *Water hyacinth, *Water pollution, Eichhormia crassipes, Hydrilla verticillata, Silage.

As an alternative to chemical control, water hyacinth (Eichhornia crassipes) and hydrilla (Hydrilla verticillata) can be converted to agriculturaly useful products. Whole or chopped plants can be readily composted to create an organic material for potting plants. The 90 to 95% moisture content plants can be pressed to remove 75% of the water with a modest energy input. The pressed plants can be ensiled with suitable additives or dried to make animal feed. Animal acceptability of properly made hyacinth silage was very good. Animal utilization of protein was poor and that of other nutrients was fair for both dried and ensiled water hyacinth.

PB-231 269/2 PC A03/MF A01
Oregon Univ., Eugene. Bureau of Governmental Research and Service.
Rural Transfer and Modified Landfill. A Comparison of Cost Indicators for Low Volume Rural Solid Waste Disposal Methods
Dec 73, 45p

Keywords: Solid waste disposal, Rural areas, Management planning, Costs, Transportation, Oregon, *Waste disposal, Sanitary landfills, Lane County(Oregon), Waste transfer stations.

One of the key considerations in selecting a system of solid waste management is the relative costs of the available alternative systems. This report was prepared in order to provide public officials and solid waste management planners with information upon which they can base estimated costs of operating a rural transfer system as well as a modified landfill system. The suggested estimating techniques are compatible and permit comparison of the estimated costs of these two alternative management systems. The experience of the Lane County, Oregon Solid Waste Division provided the basis for development of the cost estimating techniques outlined in this report.

PB-231 341/9 PC A12/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Wind Energy Conversion Systems. Workshop Proceedings Held at Washington, D.C. on 11-13 June 1973
Joseph M. Savino. Dec 73, 267p* N74-16757
Grant NSF-AG-465

Keywords: Wind power generation, Meetings, Windmills, Wind, Electric power plants, Sites, Site surveys, Planning, Electric generators, Rotors, Electric convert-

ers, Energy storage, Towers, *Wind energy, *Electric power, Energy conversion.

Contents:
- Important past developments;
- Wind characteristics and siting problems;
- Rotor characteristics;
- Energy conversion systems;
- Energy storage;
- Small wind power systems for remote and individual applications;
- Wind power systems for large-scale applications;
- Tower structures;
- Committee reports.

PB-231 391/4 PC A04/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Compaction of Soils and Stabilized Bases on Road in East Africa
M. P. O'Reilly. 1974, 75p Rept no. TRRL-LR-600

Keywords: Pavement bases, Soil compacting, *Roads, *Soil stabilization, Soil water, Tropical regions, Construction, Test methods, Sands, Clay soils, Gravel, Porosity, Africa, Great Britain, Subsaharan Africa, *Pavements, *East Africa.

As part of a study of aspects of normal road-building practice in tropical countries, the states of compaction achieved in road bases and earthworks were investigated at ten road construction schemes in East Africa. In addition, where possible, controlled compaction trials were carried out. The most significant conclusion from the investigation is that the states of compaction achieved in the field correspond quite closely with those obtained in full-scale compaction tests carried out at the Transport and Road Research Laboratory. The study showed that the states of compaction commonly specified for tropical roads can be attained under normal working condition. (Modified author abstract)

PB-231 485/4 PC A11/MF A01
Texas Water Development Board, Austin. Systems Engineering Div.
Techniques for Identifying and Evaluating Market and Non-Market Benefits and Costs of Water Resource Systems
Completion rept.
Milton L. Holloway. Jun 73, 24* OWRR-C-3352(3738)(1)
Contract DI-14-31-0001-3738

Keywords: *Water resources, Systems analysis, Water economy, Water management, Benefit cost analysis, Allocations, Socioeconomic conditions, Economic development, Policies, Mathematical models, Demand(Economics), Simulation, Regional planning, Environments, Whitney Lake, Lewisville Lake, Bolton Lake, Texas, Aquatic environments, Water demand.

The research project was designed to provide a set of analytical tools for water resource planners and decision-makers to assist them in measuring and evaluating the market and non-market benefits and costs of water resource systems. The techniques are designed to be sufficiently flexible to analyze all types of water development and management policies. The report describes: (1) the techniques developed to measure the economic, environmental, and social impacts of water policy alternatives, and (2) the application of these techniques to a test case of three existing reservoirs to determine the method's efficacy. The analyses are conducted in three major areas: economic, environmental, and social. (Modified author abstract)

PB-231 894/7 PC A05/MF A01
Forest Products Lab., Madison, WI.
Physical, Mechanical, and Other Properties of Selected Secondary Species in Surinam, Peru, Columbia, Nigeria, Gabon, Phillippines, and Malaysia
Martin Chudnoff. Nov 73, 83p* TA/OST-73-24
Contract PASA-TA(AJ)-2-73

Keywords: *Wood, Tropical regions, Hardwoods, Drying, Mechanical properties, Bending, Modulus of elasticity, Flexural strength, Durability, Density(Mass/volume), Surinam, Seru, Colombia, Nigeria, Gabon, Phillippines, Malaysia.

The report presents previously published information on the tree and wood characteristics of selected secondary species growing in seven tropical countries.

PB-232 259/2 PC A13/MF A01
Office of Water Resources Research, Washington, D.C. Water Resources Scientific Information Center.
Phreatophytes. A Bibliography, Revised
Patricia Paylore. Apr 74, 282p* WRSIC-74-201, W74-07829

Keywords: *Plants(Botany), Bibliographies, Arid land, Range grasses, Soil water, Evapotransporation, Vegetation, Water table, Land reclamation, Shrubs, Soil erosion, Water loss, Irrigation, Phreatophytes, Water demand, Water yield improvements.

The report, containing 183 abstracts, is another in a series of planned bibliographies in water resources to be produced from the information base comprising Selected Water Resources Abstracts (SWRA). At the time of search for this bibliography, the data base had 68,063 abstracts covering SWRA through February 1974 (Volume 7, Number 4). Author and subject indexes are included.

PB-232 292/3 PC A08/MF A01
Housing Assistance Council, Washington, DC.
An Analysis of Alternative Methods of Rural Home Repair
Final rept.
Gordon Cavanaugh. 29 Jun 73, 175p HUD-PDR-431

Keywords: Rural occupied housing units, Residential alterations and repairs, Methodology, Demography, Feasibility, Financing, Rehabilitation, Federal programs, Legislation, Income level, Subsidies, Models, Recommendations, *Houses, Alternatives.

An analysis is made of home repair alternatives which are understandable only within a context of the housing conditions and the prevailing resources in rural America. Various recommendations were made with respect to new institutions, changes, and reforms for the report.

PB-232 307/9 PC E03/MF A01
NAHB Research Foundation, Inc., Rockville, Md.
Small Sewage Treatment Systems. Experience and Cost Data in 61 Subdivisions in 12 States
1959, 48p

Keywords: *Sewage treatment.

Contents: Policy; Costs; legislation; aesthetic considerations; what is sewage treatment; degree of treatment needed; stage construction for flexibility; operation and maintenance; successful sewerage installations; and incorporating sewage collection and treatment in the subdivision plan.

PB-232 525/6 PC A04/MF A01
National Academy of Sciences, Washington, DC.
Nutritional Properties of Rice
D. F. Houston, and G. O. Kohler. 1970, 69p

Keywords: *Rice, Human nutrition, Food composition, Carbohydrates, Food processing, Nutritive value, Diets, Proteins, Amino acids, Vitamins, Food preparation, Classifications, Tables(Data), Bibliographies.

Contents:
- Background and present situation;
- Composition of rice and its milling products;
- Relative nutritional adequacy and nutrient availability of rice and its milling products;
- Enrichment and supplementation;
- Types of processed products and effects of processing on nutritional values;
- Effect of cooking processes on nutritional values;
- Special dietary values and problems;
- Areas for further research;
- Bibliography.

PB-233 692/3 PC A05/MF A01
International Biological Program. U.S. National Committee.
Insect-Plant Interactions. Report of a Work Conference
1969, 100p
Contract NSF-C310

Keywords: Meetings, *Plants(Botany), *Insects, Neurology, Behavior, Hormones, Responses, Physiology, Chemical reactions.

The report contains summaries of reports by some 36 participants on a wide variety of aspects of relationships between plants and insects including juvenile hormones and analogues, ecdysones, plant chemicals affecting insect behavior, and neurophysiological studies of responses to plant chemicals.

PB-233 956/2 PC A08/MF A01
Stanford Research Inst., Menlo Park, CA.
Effective Utilization of Solar Engegy to Produce Clean Fuel
Final rept.
John A. Alich, Jr, and Robert E. Inman. Jun 74, 164p* NSF-RANN/SE/GI-38723/FR-74-2
Grant NSF-GI-38723

Keywords: Fuels, *Electric power, Vegetation, Biomass, Plant growth, Mass production, Production capacity, Farm crops, Farm management, Agricultural economics, Aquatic plants, Algae, Solar radiation, *Bioconversion, *Methane, *Agricultural wastes.

The suitability of plant material as an energy feedstock was evaluated. Items covered include: types of vegetation best suited for a solar conversion facility, type and availability of land, logistics and economics of growing the desired crop, energy budget for plant material production and harvesting, and a technoeconomic comparison of firing the crops directly for electric power generation with converting them to clean fuel gas (methane or low-Btu gas) either at the farm site or at selected markets. Research needs in key technical and economic areas are pointed out.

PB-234 444/8 PC A05/MF A01
RAI Research Corp., Hauppauge, NY.
Improvement of Treatment of Food Industry Waste
Environmental protection technology series
Sidney B. Tuwiner. May 74, 76p EPA-660/2-74-035

Keywords: *Dairies, Industrial waste treatment, Food processing, Activated carbon treatment, Byproducts, Flotation, Oxidation, Carbohydrates, Material recovery, Proteins, Electrolysis, *Waste treatment, Whey, Water pollution control, Chemical oxygen demand, Froth flotation, Cheese whey.

Laboratory studies were conducted to determine the feasibility of reducing the COD demand of cheese whey waste generated from dairy processing plants. Three primary processing variables were studied: Agitation, temperature, and current density. Results indicate electrolytic oxidation efficiency was best at 70C, agitation at 9.6 feet per second and a current density of 9.5 amperes per square foot (equivalent to 6 amperes in the test cell investigated). Concentration of 60 percent of the whey protein was also possible by collection of the froth produced during electrolysis. This mechanism of COD reduction could afford recoverable protein from the whey. Carbon adsorption of the electrolyzed whey was also shown to be extremely effective in reducing the COD. The carbohydrates after oxidation to carboxylic acids are very readily adsorbed, the carbon loading being in excess of that expected for secondary effluents. The feasibility of combining the electrolytic oxidation with froth collection and carbon adsorption is proposed as a possible attractive procedure for recovery of values from the whey.

PB-234 503/1 PC A05/MF A01
National Research Council, Washington, DC. Building Research Advisory Board.
Roofing in Developing Countries. Research for New Technologies
1974, 85p
Contract AID/csd-2584
Library of Congress Catalog Card no. 73-10037

Keywords: Roofing, Developing countries, Roofs, Housing shortages, Binders(Materials), Plastics, Cellular plastic, Sulfur, Plant fibers, Wood wastes, Reinforced concrete, Clays, Fibers, Thermoplastic resins, Reinforcing materials, Composite materials, Cements, Asphalts, Iron, Agricultural wastes, Cost analysis, *Housing, Ferrocement.

More than 80 developing countries suffer from an acute housing shortage, principally because of the ever-increasing need for new housing created by expanding populations and the periodic large-scale loss of housing from natural disasters. The report presents

the committee's conclusions and recommendations concerning areas of research and kinds of materials indicating significant potential for the development of new roofing technologies that could provide early solution to the particular problems of developing countries. Ten appendices address various technical aspects of potential new roofing technologies.

PB-235 270/6 PC A19/MF A01
National Academy of Sciences, Washington, DC.
Regional Workshop on Water Resources, Environment and National Development held at Singapore on 13-17 March 1972. Volume II: Selected Papers
Mar 72, 447p
Contract AID/c. 1-2584
See also PB-217 117.

Keywords: *Water resources, *Environmental impacts, *Southeast Asia, Meetings, Environmental health, Regional planning, Groundwater, *Sewage treatment, Flood control, Water supply, Toxicity, Industrial waste treatment, Water management, Rice plants, Irrigation, Waste water reuse, Water pollution control, *Water pollution.

Volume II contains selected papers presented at the Workshop on Water Resources, Environment, and National Development. The main purpose of the Workshop was to focus attention on current problems of water resources and the environment faced by countries of the Southeast Asian region, and stimulate regional cooperation in seeking solutions.

PB-235 410/8 PC A05/MF A01
National Academy of Sciences-National Research Council, Washington, DC.
Food Science in Developing Countries: A Selection of Unsolved Problems
1974, 92p*
Contract AID/csd-2584
Library of Congress Catalog Card No. 74-1602.

Keywords: Human nutrition, Food, Developing countries, New technology, Resources, Preserving, Processing, Storage, Food composition, Food deterioration, Problem solving, *Food supply.

The report presents a collection of selected problems in the fields of food science and nutrition which are of immediate concern to developing countries. Each problem is organized under the following headings: Problem description; background information; possible approaches to a solution; special requirements; bibliography; and key contact(s).

PB-235 504/8 PC A05/MF A01
Milbrew, Inc., Juneau, Wis. Amber Labs. Div.
Protein Production from Acid Whey via Fermentation
Environmental protection technology series
Sheldon Bernstein, and Thomas C. Everson. May 74, 89p EPA-660/2-74-025
Grant EPA-S-800747
Prepared in cooperation with National Environmental Research Center, Corvallis, Oreg.

Keywords: Fermentation, Dairy products, Feeding stuffs, Industrial waste treatment, Pilot plants, Proteins, Cheeses, Byproducts, Livestock, Cost estimates, Amino acids, Investments, Food processing, *Waste treatment, *Food products, Cheese whey, Water pollution control.

From the operation of a demonstration pilot plant over extended periods of time, it has been shown that yeast may be grown on an acid whey or sweet whey medium in a continuous, deep tank aerated fermentor. Variations in fermentation conditions, strain selection, and medium composition produced cell concentrations of several billion cells per milliliter. By a process of evaporation and spray drying the whole fermented whey mass and the utilization of the evaporator condensate to dilute incoming condensed whey, a high grade, nontoxic, protein feed material may be produced without any effluent streams. Amino acid analyses and protein efficiency ratios are presented for this feed material. This whey fermentation is one means of converting large quantities of a potential environmental pollutant into a useful and needed product.

PB-235 575/8 PC A07/MF A01
Oklahoma Cooperative Fishery Unit, Stillwater.
Paunch Manure as a Feed Supplement in Channel Catfish Farming
Environmental protection technology series
Robert C. Summerfelt, and S. C. Yin. May 74, 129p
EPA-600/2-74-046
Grant EPA-R-800746

Keywords: Catfishes, Aquaculture, Water pollution, Feeding stuffs, Agricultural wastes, Beef cattle, Water quality, Animal nutrition, Diets, Food processing, Ponds, *Fishes, Water pollution effects(Animals), Paunch manure, Slaughtering house wastes.

Part A of the report examines the feasibility of using dried paunch at 10, 20, and 30% levels in feed for pond-rearing yearling channel catfish to market-size, and at a 10% level for cage-culture of yearling catfish. Part B describes the effects of fish culture, using standard feeds and paunch-containing feeds, on water quality of fish ponds. In all, one physical, one bacteriological, and fifteen chemical parameters were measured. Regardless of feed type, pond-reared fish grew faster than the cage-reared fish. There was no significant difference in final weights attained by fish given standard, and 10 and 20% paunch feeds but fish given 30% paunch were significantly smaller. Neither the pond culture nor the cage culture caused deterioration in water quality in any of the ponds to any appreciable degree in one growing season of 24 weeks. (Modified author abstract)

PB-235 801/8 PC E02/MF A01
Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
Some Woods of Hawaii...Properties and Uses of 16 Commercial Species
Forest Service general technical rept. (Final)
Roger G. Skolmen. 1974, 34p Rept no. FSGTR-PSW-8

Keywords: *Wood, *Wood products, Hawaii, Eucalyptus wood, Ash wood, Redwood, Mechanical properties, Woodworking, Shrinkage, Durability.

Information is given for 16 Hawaii-grown species, both native and introduced, of present or potential commerical importance. Descriptive notes include tree characteristics, history, size, and growth rates; the timber volume available in Hawaii; and accessibility for logging. Wood properties, including appearance, weight, shrinkage, strength, workability, seasoning, durability, and finishing, are explained with reference to well-known woods, and present and potential uses are described. An appendix includes technical data. Each species is illustrated in color.

PB-236 000/6 PC A03/MF A01
MITRE Corp., McLean, VA.
Mass Transit Training Needs. Volume I. Executive Summary
Technical rept.
E. J. Thrasher, and P. Wood. May 74, 42p* MTR-6681-Vol-1, UMTA-VA-06-0004-74-1
Contract DOT-UT-10005
Paper copy also available in set of 5 reports as PB-235 999-SET.

Keywords: Training programs, Passenger transportation, Personnel development, Motor vehicle operators, Maintenance personnel, Bus lines, Specialized training, Mass transportation, Job analysis, Training needs, Cost effectiveness, *Transportation, *Training, *Buses(Vehicles).

The report is the first of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This study includes a detailed analysis of the training requirements; a discussion of the availability of training programs to meet the needs of the industry; an outline of supplementary material needed to bring training programs up to an acceptable standard; and proposals for programs to upgrade the standard of training as it currently exists. Specifically, this volume summarizes the results of an inquiry into industry needs for standardized programs regarding training of (1) bus operators, (2) bus operator instructors, (3) bus mechanics, (4) bus mechanic instructors, and (5) rapid transit rail car repairmen. Following a description of programs currently in use at transit properties, the general contents of the respective standardized programs are outlined, the role of the Federal government in funding is examined, alternative methods of delivering programs are discussed, and costs of development and demonstration are estimated.

PB-236 001/4 PC A06/MF A01
MITRE Corp., McLean, VA.
Mass Transit Training Needs. Volume II. History and Methodology
Technical rept.
E. J. Thrasher, and P. Wood. Jun 74, 104p* MTR-6681-Vol-2, UMTA-VA-06-0004-74-2
Contract DOT-UT-10005
Paper copy also available in set of 5 reports as PB-235 999-SET.

Keywords: Training programs, Passenger transportation, Project planning, Mass transportation, Personnel development, Specialized training, Motor vehicle operators, Maintenance personnel, Training needs, *Transportation, *Training, *Buses(Vehicles).

The report is the second volume of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This volume describes the history and methodology of the program. Statistics relating to transit industry training are derived.

PB-236 002/2 PC A09/MF A01
MITRE Corp., McLean, VA.
Mass Transit Training Needs. Volume III. Bus Operator Training Program, Bus Operator Instructor Training Program
Technical rept.
Edward J. Thrasher. Jul 74, 183p* MTR-6681-Vol-3, UMTA-VA-06-0004-74-3
Contract DOT-UT-10005
Paper copy also available in set of 5 reports as PB-235 999-SET.

Keywords: Motor vehicle operators, Specialized training, Instructors, Training programs, Personnel development, Job analysis, *Buses(Vehicles), *Transportation, *Training.

The report is the third of a five-volume series summarizing the finding, conclusions, and recommendations of a study of urban mass transit training needs. This volume is devoted to bus operators and bus operator instructors. A recommended standardized course for bus operators is presented, together with sources of suitable training materials. One significant conclusion reached is that it is considered that existing sources of training are adequate to meet the needs of operator instructors.

PB-236 143/4 PC A04/MF A01
Cornell Univ., Ithaca, N. Y. Center for Environmental Quality Management.
Workshop on Research Methodologies for Studies of Energy, Food, Man, and Environment
Final rept. on Phase 1
David Pimentel, Walter R. Lynn, William K. MacReynolds, Marie T. Hewes, and Sharon Rush.
Aug 74, 58p*
Grant NSF-GB-43996

Keywords: *Food supply, Food consumption, Farm crops, Nutrition, Production, Corn, Rice, Wheat, Potatoes, Fertilizers, Farm management, *Energy, *Environmental surveys, Energy conversion efficiency, Energy requirements.

With overpopulation, energy shortages, and environmental degradation the world's population is fast losing its capacity to feed itself. To produce more food to feed the rapidly growing world population will require intensifying crop production on limited arable land. This will, in turn, place a greater demand upon the already scarce energy resources. Hence, a need clearly exists to make more effective use of the world's known energy and land resources. Discussed are research needs concerning energy inputs in crop production, alternatives in food production for effective use of energy and environmental resources, and estimates of energy needs to increase world food production.

PB-236 285/3 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Special Report on Techniques of Aided Self-Help Housing. Some Examples of U.S. and Overseas Experience
Ervan Bueneman. Nov 73, 29p

Keywords: Self help housing, Developing countries, Houses, Construction, Projects, Puerto Rico, Guatemala, Tanzania, Trinidad, *Housing.

In some developing countries, helping families build their own homes became the basis of national housing policy long after the departure of the experts who first introduced and developed the concept. Organized aided self-help housing programs are considered a way by which many families could obtain decent housing through their own efforts at a relatively small capital expenditure. The report describes selected experiences in Puerto Rico, Trinidad/Tobago, Guatemala, Tanzania, and selected U.S. areas.

PB-236 391/9 PC A05/MF A01
PADCO, Inc., Washington, D.C.
Guidelines for Establishing and Administering Land Development Agencies in the Developing Countries
Ideas and methods exchange
Alfred P. Van Huyck, and Milton Kaplan. Aug 73, 76p IME-69
Contract HUD-H-1899

Keywords: Land development, Developing countries, Services, Urban areas, Urban planning, Public administration, Reviews, Recommendations, Management guidelines, *Land use, Government agencies.

The report examines the crisis in urban land from the perspective of one instrument available to the public sector - the Land Development Agency - through which the public interest can be represented in the urban land market. It is not intended to be an exhaustive study of world experience, but rather a basic review of the key issues of concern and the preparation of recommendations and guidelines for the establishment and administration of Land Development Agencies. Its purpose is to stimulate interested persons to undertake further studies leading to the improvement of land development agencies in the developing countries.

PB-236 978/3 PC A02/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
HUD International Country Reports. Panama
1971, 15p Rept no. HUD-168-SF
See also PB-236 979.

Keywords: *Housing, *Urban planning, *Panama, Developing countries, Urban construction, Economic conditions, Construction industry, Construction materials, International trade, Foreign market surveys, Foreign investments, International country reports.

The report presents information on various aspects of housing and urban development in Panama. The information was developed from the analysis of foreign documents, team visits, document exchanges under bilateral agreements and from informal contacts. Each study describes geography, climate, population, the government system, some economic data, and housing and urban development activity, including financial institutions.

PB-236 980/9 PC A02/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
HUD International Country Reports. Peru
1971, 18p Rept no HUD-275-IA
See also PB-236 981.

Keywords: *Housing, *Urban planning, *Peru, Developing countries, Urban construction, Economic conditions, Construction industry, Construction materials, International trade, Foreign market surveys, Foreign investments, International country reports.

The report presents information on various aspects of housing and urban development in Peru. The information was developed from the analysis of foreign documents, team visits, and document exchanges under bilateral agreements and from informal contacts. Each study describes geography, climate, population, the government system, some economic data, and housing and urban development activity, including financial institutions.

PB-237 042/7 PC A11/MF A01
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Design and Construction of a Residential Solar Heating and Cooling System
Semi-annual progress rept. 1 Jan-31 Jul 74
George O. G. Lof. Aug 74, 233p* NSF/RANN/SE/GI-40457/PR/74/2, NSF/RA/N-74-104
Grant NSF-GI-40457

Keywords: Solar heating, Residential buildings, Design criteria, Construction, Specifications, Drawings, Engineering drawings, Heat exchangers, Heat pumps, Lithium bromide, Water heaters, Performance evaluation, Computerized simulation, Cost estimates, Antireflective coatings, *Buildings, *Solar cooling systems, *Solar heating systems, *Solar water heating, Solar air conditioning, Solar collectors, Solar water heaters.

The first integrated system providing heating and cooling to a building by use of solar energy has been designed and installed in a residential-type building at Colorado State University. Solar heated liquid supplies heat to air circulating in the building and to a lithium bromide absorption air conditioner. Service hot water is also provided. Approximately two-thirds of the heating and cooling loads are expected to be met by solar energy, the balance by natural gas. The report contains details of design and principles of operation. A breakdown of costs of equipment and its installation is provided.

PB-237 299/3 PC A17/MF A01
American Association on Mental Deficiency, Washington, D.C.
International Research Seminar on Vocational Rehabilitation of the Mentally Retarded
Final rept.
George Soloyanis, John E. Loth, and Melvin Cohen. 1972, 394p*
Grant SRS-22-55092

Keywords: *Rehabilitation, Mental deficiency, Meetings, *Vocational guidance, Social welfare, Schools, Government policies, International comparison, Specialized training, Planning, Mentally retarded persons.

The overall purpose of the conference was to provide a forum for the exchange of information emanating from the United States and overseas research concerning the vocational rehabilitation of mentally retarded individuals. More specifically, the research explored were those investigations pertaining to programs, operations and services of rehabilitation facilities.

PB-238 103/6 PC A08/MF A01
National Center for Energy Management and Power, Philadelphia, PA.
Technology for the Conversion of Solar Energy to Fuel Gas
Annual rept.
31 Jan 74, 153p NSF/RANN/SE/GI34991/PR73/4, NSF/RA/N-74-153
Grant NSF-GI-29729, NSF-GI-34991

Keywords: *Methane, Manufactured gas, Gas production, Plants(Biology), Digestion(Decomposition), Fermentation, Newsprint, Absorbent papers, Grasses, Garbage, Chlorella, Algae, Fertilizers, Wastes, Feeding stuffs, Mud, *Agricultural wastes, Effluents, Anaerobic processes, Digesters, Fresh water, Brackish water, Sea water, Production rate, Alkalinity, Carbon dioxide, Nitrogen, Carbon, Solar energy, Chemical analysis, Photosynthesis, Biodeterioration, *Bioconversion, Solar energy conversion.

The formation of methane by biological conversion of a number of organic materials has been examined. The materials exposed to the anaerobic fermentation process included paper, grass, household garbage, fresh water algae, water hyacinth, seaweed, cattle manure, dry manure, dry dog food. These materials have been examined separately and in various combinations. During operation of the digester, the amount and composition (methane and carbon dioxide) of the gases produced by the fermentation were determined and extensive chemical analyses of the composition of the liquid contents of the digesters were carried out. Similar chemical analyses of the various materials fed to the digester were carried out as well as analyses of the sea water used in several of the studies.

PB-236 291/9 PC A06/MF A01
Bacardi Corp., San Diego, Puerto Rico.
Rum Distillery Slops Treatment by Anaerobic Contact Process
Environmental protection technology series
T. G. Shea, E. Ramos, J. Rodriguez, and G. H. Dorion. Jul 74, 109p EPA-660/2-74-074
Grant EPA-R-800935

Keywords: Anaerobic processes, Industrial waste treatment, *Distilleries, Digestion(Decomposition), Cost estimates, Process charting, Settling, Suspended sediments, Design, Performance evaluation, Reaction kinetics, Digestion(Decomposition), Waste water, Cost effectiveness, Methane, Byproducts, Pilot plants, *Waste treatment, *Bioconversion, Rum distilleries, Water pollution control, Chemical oxygen demand, Biological industrial waste treatment.

The general objectives of the present study were to develop an anaerobic digestion process for the treatment of the rum distillery slops stream at the pilot scale, and to establish design criteria for the full-scale application of the process. Both bench and pilot-scale experimental studies were conducted with the anaerobic contact process flow sheet (incorporating biomass recycle) to permit determination of the Monod kinetic constants and the kinetic relationships describing the anaerobic treatment of the slops. The process kinetics were used to examine the operating and performance characteristics of a plant-scale application. A process flow sheet was established and design criteria developed as the basis for estimating the cost of a plant-scale installation. The process kinetic relationships and the economic analysis were used to structure a cost-performance relationship to examine tradeoffs between cost, performance, and selected design variables.

PB-238 591/2 PC A02/MF A01
Kansas State Univ., Manhattan. Cooperative Extension Service.
Guidelines for Land Disposal of Feedlot Lagoon Water
Research rept.
William L. Powers, Russell L. Herpich, Larry S. Murphy, David A. Whitney, and Harold L. Manges. 1974, 9p OWRT-A-046-KAN(2)
Contract DI-14-31-0001-3516

Keywords: Industrial waste treatment, *Agricultural wastes, Irrigation, Waste water, Lagoons(Ponds), Nutrients, Salts, Water quality, Inorganic nitrates, Inorganic phosphates, Kansas, Farms, *Waste treatment, Feedlot wastes, Water quality data.

Guidelines are provided for feedlot operators who dispose of lagoon, water on agricultural lands. The design of lagoon, pumps, and irrigation systems are not discussed. Because lagoon water contains such plant nutrients as nitrogen, phosphorus, and potassium, its application on agricultural land, in correct amounts, can increase crop yields. However, because it also contains salts of sodium, calcium, and magnesium, too much lagoon water can pollute the soil. The salt accumulation from lagoon water is most likely to occur in dry areas where precipitation is not adequate to leach the salts downward below the root zone. Guidelines on how to dispose of such lagoon water to minimize the chance of reducing the land's productivity are given. The guidelines are based on present irrigation-water-quality standards and on data collected from various feedlots in Kansas.

PB-238 849/4 PC A11/MF A01
National Academy of Sciences, Washington, DC.
African Agricultural Research Capabilities
1974, 240p* Rept no. ISBN-0-309-0224-X
Contract AID/csd-2584

Keywords: *Agriculture, Research projects, Developing countries, Africa, Research needs, Education, Soils, Agronomy, Land use, Farm crops, Agricultural economics, Manpower, Water management, Grains(Food), Vegetables, Livestock, *Research and development.

The study focuses on the question of how agricultural science and specifically agricultural research can contribute most effectively to the progress of the African nations and peoples. It covers the following topics: (1) Agricultural and educational priorities; (2) role of non-African agencies in coordination of agricultural research and education; (3) appropriate channels of communication and cooperation among nations and institutions within and outside of Africa; (4) means by which research and education can be applied most effectively to African agricultural development; and (5) a

broad assessment of the scientific manpower needs of the research systems and institutions recommended by the NAS Committee.

PB-238 909/6 PC A06/MF A01
Florida Atlantic Univ., Boca Raton. Dept. of Biological Sciences.
Biological Control of Aquatic Vegetation
Thomas T. Sturrock. Aug 73, 107p EPA/660/3-74-007
Grant EPA-R-801036

Keywords: Aquatic weeds, *Weed control, Florida, Plant growth, Fungi, Plant pathology, Culture media, Morphology, Microorganisms, Pest control, *Aquatic plant control, Aquatic weed control, Hydrilla verticillata, Eichhornia crassipes, Water hyacinth, Deuteromycetes(Imperfect fungi), Alternaria, Biological weed control, Biological pest control.

Laboratory studies were conducted to determine optimal growth conditions of Hydrilla verticillata and Eichhornia crassipes on both entire plants and detached leaf cultures. Techniques were then developed for surface sterilization of both the entire and plant parts for both species. Numerous weed infested habitats in Florida were examined for signs of aquatic plant diseases. These studies indicated various environmental factors as well as possible microbial pathogens as a source of plant tissue debilitation. No significant microbial pathogen was observed for H. verticillata, however, a pathogenic species of a Deutromycete was isolated from a leaf spot on E. crassipes. Characterization of this fungus revealed it to be an Alternaria species of the order Moniales. Infection was produced via agar block techniques and aerosol spore suspensions. Experiments are described concerning the virulence and host range for thise fungal pathogen.

PB-239 465/8 PC A16/MF A01
Little (Arthur D.), Inc., Cambridge, MA.
An Overview of Alternative Energy Sources for LDCs
7 Aug 74, 372p* Rept no. ADL-C-77105
Contract AID/ta/C-1089

Keywords: *Electric power, Energy supplies, Developing countries, Energy sources, Tidal power generation, Geothermal power plants, Geothermal prospecting, Wastes, Methyl alcohol, Coal gasification, Wind power generation, Solar energy conversion, Solar heating, Solar power generation, Nuclear electric power generation, Steam electric power generation, Bangladesh, Chile, Costa Rica, Dominican Republic, Ghana, India, Ivory Coast, Kenya, Pakistan, Brazil, Korea, Niger, Philippines, Sri Lanka, Thailand, Underdeveloped nations, International trade, Energy consumption, Fuel consumption, Electric power demand, Forecasting, Predictions, Economic development, *Bioconversion, *Energy source development, *Geothermal energy, *Solar energy, *Wind energy, *Tidal energy, Energy resources.

The report presents an overview of alternative energy sources of types which could be of significant value to lesser-developed countries in adjusting to the impact of sharply higher world market prices of petroleum. It presents a highly condensed review of non-conventional energy technologies, together with some limited commentary on the relevance of the more conventional technologies in new lesser-developed country (LDC) economic settings. It also provides a summary on a country-by-country basis of the current economic posture and energy resources array in fifteen LDC's selected as being broadly representative--geographically and in terms of petroleum-price impacts--of the quite wide range of situations that need to be considered.

PB-239 472/4 PC A08/MF A01
National Academy of Sciences, Washington, DC. Advisory Committee on Technology Innovation.
More Water for Arid Lands, Promising Technologies and Research Opportunities
1974, 161p
Contract AID/csd-2584

Keywords: *Water supply, Water conservation, *Arid land, Agriculture, Irrigation, Waste water reuse, Surface water runoff, Water wells, Remote sensing, Water loss, Soil water, Evapotranspiration, Salt water, Percolation, Controlled atmospheres.

Little known but promising technologies for the use and conservation of scarce water supplies in arid areas are the subject of this report. Not a technical handbook, it aims to draw the attention of agricultural and community officials and researchers to opportunities for development projects with probable high social value. Each technology is presented in a separate chapter and arranged under the following topics: methods, advantages, limitations, stage of development, needed research and development, selected readings (a short list of reviews and general articles) and contacts (a list of individuals or organizations the panelists know to be involved in relevant research).

PB-239 478/1 PC A05/MF A01
National Academy of Sciences, Washington, DC.
Workshop on Education and Training Needs for Philippine Environmental Programs Held in Manila, Philippines, May 27-31, 1974
May 74, 84p
Contract AID/csd-2584

Keywords: Meetings, Environmental issues, *Philippines, Workshops, Scientists, United States, Training needs, Engineers, *Education, Administrators, Resources, Developing countries, Problem solving, Planning, *Environmental management.

The workshop was designed to bring together Philippine and American scientists, engineers, educators, and administrators for collaborative identification of problems and issues relevant to environmental education and training needs, development of possible alternative solutions to the problems, and consideration of ways to strengthen the host country's capacity to plan and manage environmental education programs.

PB-239 492/2 PC A05/MF A01
National Academy of Sciences, Washington, DC.
Scientific and Technical Information Needs and Resources in Taiwan.
1974, 86p
Report on a Workshop, held in Washington, D.C. on 24-28 April, 1973.

Keywords: Information systems, Information retrieval, Information centers, Manpower, *Taiwan, Documentation, Libraries, Meetings, Data processing, *Information services..

The National Academy of Sciences - National Research Council and the Academie Sinica of the Taiwan jointly sponsored a workshop on the Scientific and Technical Information Needs and Resources of the Taiwan from 16 April to 14 May, 1973. The workshop consisted of a three-day conference in Washington, D.C. and technical visits to 33 U.S. information organizations before and after the conference. Purposes of workshop were: (1) To identify the needs for S and T information in Taiwan and the resources required to meet them; (2) to examine and make recommendations that Taiwan might take to strengthen its national scientific and technical information infrastructure, and to establish linkages with information systems, centers, and services in other countries; and (3) to identify areas for future cooperative efforts between counterpart U.S. and Chinese institutions.

PB-239 557-T PC A99/MF A01
Fogarty International Center, Bethesda, Md.
A Barefoot Doctor's Manual
1974, 972p* Rept no. DHEW/NIH-75-695
Trans. of unidentified Chinese language mono., n.p., n.d. 960p. Pub. by Institute of Traditional Chinese Medicine of Human Province (Chinese People's Republic).

Keywords: *China, Medical personnel, Clinical medicine. Anatomy, Hygiene, Diagnosis(Medicine), Therapy, Education, Drugs, Pharmacology, Diseases, Medical services, Public health, Manuals, Physicians, *Birth control, *Health manpower, *Health care delivery, Paraprofessional personnel, Herbs, *Medicinal plants, Acupuncture.

The book was prepared by the Institute of Traditional Chinese Medicine of Hunan Province, China and contains instructions on health care for the use by paraprofessional personnel. It contains sections on anatomy, hygiene, diagnostic techniques, therapeutic techniques, birth control, diagnosis and treatment of common diseases and Chinese herbal medicine.

PB-239 799/0 PC A08/MF A01
Federal Working Group on Pest Management, Rockville, Md.
Proceedings of the National Conference on Protective Clothing and Safety Equipment for Pesticide Workers Held in Atlanta, Georgia, May 1-2, 1972
Final rept.
Jun 72, 170p Rept no. FWGPM-72-3

Keywords: *Pesticides, Industrial hygiene, Personnel, Protective clothing, Protective masks, Industrial atmospheres, Safety devices, Dust control, Ventilation, Materials handling, Accidents, Safety engineering, Meetings, Warehouses, Storage, Transportation.

The report presents papers concerning safety and hygiene in the pesticide industry. Topics include: Effects of different kinds of pesticide exposures on man as determined through laboratory testing; protection of individuals who mix or apply pesticides in the field; protective clothing, goggles, gloves and foot coverings-their value during handling and use of pesticides; effectiveness of respirators and similar gear for protection against inhaling pesticides; ventilation and dust control systems to protect workers in enclosed areas; innovations in pesticide application equipment that protect workers from exposure to pesticides; and where protective clothing and safety equipment must be available; occupational health and safety standards that apply to pesticide exposure situations, regulations governing hazardous chemicals in loading and transportation operations, rules for workers in warehouses, attitudes and practices of pesticide applicators; pesticide worker accidents; acceptance of safety programs; and concern of the Federal Government. Eight recommendations for Federal interdepartmental action were made by the Safety Panel.

PB-239 875/8 PC A06/MF A01
Maryland Univ., College Park. Bureau of Business and Economic Research.
Effects of Economic Development Upon Water Resources (An Interindustry Approach to Modeling Economic-Environmental Systems)
Technical rept.
John H. Cumberland, and Bruce N. Stram. 1974, 111p TR-18, OWRT-B-007-MD(1)
Contract DI-14-31-0001-3089

Keywords: *Water pollution, Management planning, *Water resources, *Air pollution, Economic development, Economic models, Mathematical models Statistical methods, Classifications, Sources, Residues, Waste disposal, Economic analysis, Water pollution abatement, Environmental models, *Environmental management, Formats.

A theoretical model is presented of interrelationships between economic and environmental models useful for water management, together with basic data on 130 types of pollutants from 70 different industries. The purpose is to get good data and analytic methods needed to improve environmental management. The first step has been to devise a materials balance accounting structure to provide a format for emissions. The collected and internally developed data have been used to create a simple two-stage model of the emissions process. High priority in environmental research appears appropriate for the evaluation of damage functions associated with various reported emissions levels. Integration of this additional information with the data on hand should lead to the improvement desired in environmental management.

PB-239 883/2 PC A03/MF A01
Massachusetts Inst. of Tech., Cambridge. Center for International Studies.
Radio Broadcasting and Telecommunications in Nepal
George Rathjens, Robert Butman, and Ramesh Vaidya. Jan 75, 27p Rept no. C/75-3

Keywords. Radio broadcasting, Telecommunication, *Education, *Nepal.

The report presents observations on Nepali radio broadcast services in general taking into account program content and language, geographical coverage, and questions relating to taxation and duties on radios and their manufacture. It also discusses radio for education in the schools and two-way communications.

PB-240 113/1 PC A04/MF A01
Oregon State Univ., Corvallis. Water Resources Research Inst.
Animal Waste Conversion Systems Based on Thermal Discharge
L. Boersma, E. W. R. Barlow, J. R. Miner, and H. K. Phinney. Sep 74, 58p OWRT-B-039-ORE(1)
Contract DI-14-31-0001-4121
Also available as Oregon State Univ., Corvallis. Agricultural Experiment Station. Special rept. no. 416.

Keywords: *Agricultural wastes, Manufactured gas, Heat recovery, Solid waste disposal, Feeding stuffs, Algae, Cooling water, Electric power plants, *Methane, Byproducts, Digestion(Decomposition), Digestors, Anaerobic processes, *Bioconversion, *Waste heat utilization, High protein supplements, *Manures.

Society faces many problems related to its growth in numbers and standard of living. Of major concern is environmental degradation resulting from pollution and the consumptive use of non-renewable natural resources. An animal waste management scheme was developed on the premise that one solution to these problems is the development of integrated production systems with recycled sources. The waste product of one industry must become the raw material for another. The feasibility of using waste heat from steam electric plants to sustain a food-producing complex which recycles nutrients is analyzed. Specifically, it is proposed to use microorganisms to convert animal waste into a high protein animal feed and a methane-rich fuel gas. Waste heat from steam electric plants is used as a low cost source of energy for maintaining stable, elevated temperatures in anaerobic digestion and single cell protein production units. Benefits to society include: improved efficiency of energy use and food production, recycling of raw materials, and conservation of non-renewable resources.

PB-240 244/4 PC A03/MF A01
National Academy of Sciences, Washington, DC.
An International Centre for Manatee Research: Report of a Workshop held 7-13 February 1974 in Georgetown, Guyana, South America
1974, 39p*
Contract AID/csd-2584

Keywords: *Weed control, Aquatic animals, Meetings, Mammals, Ecology. Research, Biology, Guyana, Developing countries, Tropical regions, *Aquaculture, *Aquatic Plant control, Aquatic weed control, Biological weed control, Manatee, Trichechus.

A workshop was held in Georgetown, Guyana February 7-13, 1974 to discuss the potential usage of the manatee as a natural means of aquatic weed control as well as of the great advantages, apart from its utilitarian potential, that may be derived through basic biological research endeavors. The report outlines the various fields of research which need to be undertaken if the manatee is to be brought into effective use and the establishment of an International Centre for Research on Manatees has been recommended.

PB-240 365/7 PC A07/MF A01
Humboldt County Dept. of Public Works, Eureka, Calif.
Rural Storage and Collection Container Systems
Final rept.
Bartle Wells. 1975, 126p EPA/530/SW-81d
Grant PHS-EC-00271
Prepared in cooperation with Bartle Wells Associates, San Francisco, Calif., and Garretson, Elmendorf, Zinor, and Reibin, San Francisco, Calif. Report on Humboldt County Solid Waste Demonstration Project. See also PB-212 398.

Keywords: Solid waste disposal, Refuse disposal, Containers, Collection, Rural areas, Storage, Management planning, Cost analysis, Trucks, Earth fills, Hauling, Compacting, Financing, California, *Waste disposal, Waste transfer stations, Sanitary landfills, Humboldt County (California).

This report describes the development and financing of a county solid waste collection system for rural areas. The objective of the system was to substitute an environmentally sound method of solid waste disposal for the unsound practice of using small, random, burning dumps. The report shows that this can be accomplished. It presents a detail description of the storage and collection containers used, the construction of the container sites, and an economic analysis of the advantages/disadvantages of the use of small and large containers. The report also presents a comprehensive analysis of the development of the County financial plan.

PB-241 120/5 PC A17/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Urban and Regional Studies.
Urban Systems Research: Report of the Binational (U.S./Australian) Urban Systems Symposium (1st)
Final rept.
John W. Dickey, and Roy W. R. Muncey. Apr 75, 398p* NSF/DS-74/01
Prepared in cooperation with Commonwealth Scientific and Industrial Research Organization, Victoria (Australia). Div. of Building Research, and Department of Science, Canberra (Australia).

Keywords: *Urban planning, Urban development, Meetings, *Land use, Urban growth, Developing countries, Community development, Citizen participation, United States, Australia.

In June, 1974 the First Binational (U.S./Australian) Symposium on Urban Systems Research was held in Washington, D.C. There was 29 presentations made by experts from the two countries. These covered such areas as (1) land use models (Lowry-type, NBER, PLUM, EMPIRIC, the Direct Trip Allocation Model, System Dynamics), (2) growth allocation techniques, (3) growth management, (4) the experience of practitioners with models, (5) urban problems and practices in developing countries, (6) the United Nations' Habitat '76 Program, (7) organizing government, (6) community involvement, (9) gaming, (10) land use law, and (11) national growth policies. It was concluded from the symposium that much more work needs to be done in urban modeling, especially because of rapid changes in uncontrollable, external factors.

PB-241 579/2 MF A01
National Academy of Sciences, Washington, DC.
In Search of Population Policy. Views from the Developing World
Aug 74, 120p* Rept no. ISBN-0-309-02242-8
Contract AID/csd-3600
Library of Congress Catalog Card No. 74-10125.
Paper copy available from National Academy of Sciences, Washington, DC. 20416 $4.25.

Keywords: Population problems, Developing countries, Meetings, Policies, Population migrations, Population distribution, Mortality, Morbidity, Health statistics, Urbanization, Employment, Education, Foreign aid, Latin America, Middle East, Africa, Southeast Asia, South Asia, *population control.

The volume derives from five regional seminars held in South Asia, the Middle East, Latin America, Africa, and Southeast Asia, Reporting the results of the meetings, it provides information on policy aspects of population issues viewed at the national, community, family, and individual levels. Among the issues discussed are effects of migration and population distribution, reductions of mortality and morbidity, improvement of health care, effects of urbanization, employment, the role of education, and effects of foreign assistance. Participants include doctors, religious and civic leaders, demographers, journalists, educators.

PB-241 715/2 PC A04/MF A01
Wisconsin Univ., Madison. Water Resources Center.
Aquatic Plant Harvesting: Development of High-Speed Harvesters and Processing and Utilization of Harvested Vegetation
Technical rept.
Donald F. Livermore, Richard G. Koegel, Hjalmer D. Bruhn, Se H. Sy, and Harold F. Link. Mar 75, 52p
WIS-WRC-75-02, OWRT-B-078-WIS(2)
Contract DI-14-31-0001-3947, Grant NSF-GI-39193

Keywords: *Aquatic weeds, Harvesting, Cost analysis, *Agricultural machinery, Design, Production, Test methods, Efficiency, Vegetation, Dewatering, Separation, Distillation, Utilization, Feeding stuffs, Nutrients, Mulches, *Aquatic plant control.

Research was conducted to reduce the cost of aquatic plant harvesting by increasing harvester productivity through high-speed harvesting, by reducing the handling costs of the harvested vegetation, and/or by improving the potential for economic utilization of the vegetation. Also described are the design, construction, and testing of a craft for concentrating and collecting pre-cut, floating aquatic vegetation at speeds several times those of conventional harvesters. Recommendations are made for increasing the mechanical efficiency of this machine. A moisture prediction function was developed for aquatic vegetation subjected to pressure. Presented are data on the chemical constituents of the vegetation which were compared to conventional forage materials. Possible uses of the cut vegetation are enumerated.

PB-242 403/4 PC A08/MF A01
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 2. Housing, Transportation and Water Resources
J. P. Ruina. Apr 74, 164p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 1, PB-242 402 and Volume 3, PB-242 404, Volumn 5, PB-242 405.

Keywords: Technology utilization, Economic development, Meetings, Housing planning, Developing countries, Self help housing, Highway planning, Transportation planning, Urban transportation, *Water resources, Water management, Economic models, Construction, *Housing, *Transportation, Incremental construction.

The report contains materials on the part of a technology utilization symposium devoted to housing, transportation, and water resources, principally in the developing nations.

PB-242 405/9 PC A03/MF A01
Massachusetts Inst. of Tech., Cambridge.
Proceedings of the M.I.T. Symposium on Strategies for A.I.D. Programs in Selected Areas of Science and Technology. Volume 4. Food Technology
J. P. Ruina. Apr 74, 31p
Contract AID/ta-1067
Report on Technology Adaptation Program. See also Volume 1, PB-242 402, Volumn 3, PB-242 403, Volumn 3, PB-242 404.

Keywords: Technology utilization, Food industry, Meetings, Developing countries, Nutrition, Technology transfer, Fermentation, Feeding stuffs, Econometrics, Proteins, Nutritional deficiency diseases, *Food processing, Single cell proteins, Malnutrition.

The subject matter involves the processing, preservation and manufacture of foods. In the context of technology transfer from industrialized countries to low-income countries one might formulate two basic objectives: The first is to increase food supply, or more accurately, the supply of certain nutrients to populations. A second objective is the combatting of malnutrition.

PB-242 973/6 PC A02/MF A01
North Central Forest Exporiment Station, St. Paul, Minn.
How Craftsmen and Home Hobbyists Can Make and Use Wood Plastic Composite Materials
Forest service general technical rept. (Final)
Howard N. Rosen. Jan 74, 13p* Rept no. FSGTR-NC-10

Keywords: Wood based composites, *Plastics, *Handicrafts, Gluing, Woodworking, Impregnating, Wood processing industry, Curing, Equipment, Wood finishing, Safety, Machining, Workshops, Efficiency, *Wood products, Hobbyists.

A technique for producing craft items of wood-plastic composites in the home, school, or small shop is described. Suggestions are given on how to build the treating equipment for under $30. Wood impregnation, processing techniques, gluing, finishing, and safety are discussed. The ease and versatility of producing crafts from wood-plastic composites are demonstrated by example projects.

PB-243 367/0 PC A06/MF A01
National Academy of Sciences, Washington, D.C.
Report of the Joint AD Hoc Committee for Scientific and Technical Cooperation: Council for Scientific and Industrial Research of Ghana, Universities of Ghana and NAS
Summary rept.
1975, 119p

Contract AID/ccsd-2584

Keywords: *Research and development, *Ghana, *Technical assistance, Planning, Research projects, Agriculture, Industries, Remote sensing, Instruments, Information centers, Developing countries.

The report contains the proceedings of the NAS-CSIR Committee meeting held in Washington, D.C., July 1-3, 1974. The CSIR and NAS have since 1971, engaged in a joint collaborative program aimed at relating science and technology more effectively in solving economic and social problems in Ghana. The workshops are aimed at examining the institutional mechanism for formulating science policy, identifying research priorities and the problems in the execution of research in Ghana, finding out how best agricultural research results could be made available to user agencies.

PB-243 409/0 PC A03/MF A01
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.
Agricultural Resources Consumed in Beef Production
William Lockeretz. Jun 75, 48p* Rept no. CBNS-AE-3
Grant NSF-GI-043890

Keywords: Beef, Irrigation, Fertilizers, Feeding stuffs, Farm crops, Water supply, Production, Food consumption, Natural resources, Arid land, Forage grasses, Proteins, Food supply, Wheat plants, Soybean plants, Correlation techniques, *Food products.

The consumption of energy, fertilizer, water, and cropland has been calculated for nine different beef production systems. These systems vary with respect to region, type of pasture and cropland, and feeding program. Among the nine systems, there is a considerable range of resource intensiveness, depending on factors such as type of pasture, type of cropland (irrigated vs. dryland) and kinds of roughages and protein supplements. Data are also presented on the consumption of the same resources in the production of wheat and soybeans in the same regions, on comparable land to that used to raise cattle feeds. In all cases, the resource consumption for beef is very much greater than for a wheat/soybean mixture of equivalent protein value.

PB-243 442/1 PC A03/MF A01
National Academy of Sciences, Washington, DC.
The Winged Bean; A High-Protein Crop for the Tropics
1975, 50p
Contract AID/csd-2584

Keywords: Leguminous plants, Food, Nutritive value, Proteins, Oils, *Food products, *Plants (Botany).

Edible legumes are excellent sources of dietary protein and oils. Many nutritionists expect them to play an increasing role in meeting food needs in this time of food shortages and widespread malnutrition. In addition to the major cultivated edible legumes--soybeans, peanuts (groundnuts), peas, and beans--there are more than 50 minor tropical legumes that have received little scientific attention (mainly because researchers have concentrated on more conventional crop species, especially cereals). This report focuses on the exceptional promise offered by one of these: the winged bean.

PB-243 470/2 PC A13/MF A01
Hawaii State Advisory Task Force on Energy Policy, Honolulu.
Alternate Energy Sources for Hawaii
Report of the Committee.
Feb 75, 276p NSF/RA/G-75/003
Grant NSF-ISR71-03844-A03
Prepared in cooperation with Hawaii State Dept. of Planning and Economic Development, Honolulu, and Hawaii Natural Energy Inst., Honolulu.

Keywords: Energy sources, Hawaii, Energy conversion, Waste disposal, Plants(Botany), *Hydroelectric power, Wind power, Nuclear power, Geothermal energy conversion, Solar energy conversion, Solar sea power plants, Waterwave energy conversion, Coal, Energy storage, Environmental impacts, Economics, Energy policy, *Geothermal energy, *Solar energy, *Tidal energy, *Bioconversion, *Wind energy, *Energy source development. Solid wastes.

This is a report of the Committee on Alternate Energy Sources for Hawaii, which was established by the Governor's State Advisory Task Force on Energy Policy to help respond to problems created by the Arab oil embargo. Fourteen studies were undertaken -- ten on alternate energy sources, and four more general studies. Included as appendices to the report are all the studies on the potential of different energy sources to minimize the State's near-total dependence on seaborne petroleum. These alternate sources of energy are: solid waste; bioconversion; hydroelectric; wind; geothermal; solar collectors; ocean thermal energy conversion; waves, tides, currents, osmosis; coal; nuclear.

PB-243 639/2 PC A04/MF A01
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.
A Comparison of the Production, Economic Returns, and Energy Intensiveness of Corn Belt Farms That Do and Do Not Use Inorganic Fertilizers and Pesticides
William Lockeretz, Robert Klepper, Barry Commoner, Michael Gertler, and Sarah Fast. Jul 75, 68p* Rept no. CBNS-AE-4
Grant NSF-GI-043890

Keywords: Farms, Livestock, *Fertilizers, Pesticides, *Agricultural economics, Corn plants, Production, Inorganic compounds, *Pest control, Market value, Crop value, Correlation techniques, Probability theory, Regression analysis, Working time, Farm crops, Corn Belt, Organic farming.

The report compares crop production on a sample of 16 mixed crop-livestock farms in the Corn Belt on which no inorganic fertilizers and almost no pesticides are used, to that of a matched sample that uses conventional fertilization and pest control practices. In the 1974 crop year, the market value of the crops raised per acre was slightly higher on the conventional sample (an average of 8%), but this difference was not statistically significant at the 90% probability level. There was no difference between the two group's crop production returns, that is, value of production less operating costs. The energy intensiveness (defined as energy input divided by value of production) on the farms that do not use fertilizers is an average of one-third as much as that of the conventional group.

PB-243 702/8 PC A06/MF A01
Nebraska Univ.-Lincoln.
The Development of a High Protein Isolate from Selected Distillers By-Products
Final rept.
James G. Kendrick. Jul 75, 122p NSF/RA/T-75-021
Grant NSF-GI-42036, NSF-AER-74-10456-A1

Keywords: Proteins, Grains(Food), Food, Economic analysis, *Distilleries, Tables(Data), Corn, Wheat, By-products, Materials recovery, Extraction, Nutritive value, Toxicity, Chemical properties, Operating costs, Feeding stuffs, Food processing, *Food fortification.

Using an alkaline extraction procedure, a human-consumable protein concentrate can be obtained from corn and wheat distillers by-products. The recovery process yielded approximately 54% and 36% of the original protein (as a protein concentrate) from corn and wheat distillers by-products, respectively. Nutritional and functional tests on the distillers concentrate indicated that it can be used in the fortification of cereal-based snacks, cookies and bread, and as an emulsion binder/extender in emulsified meat products. The alkaline extraction of distillers by-products also yielded new forms of animal feeds, i.e. from corn, a 12% protein high-fiber feed, a 4% protein - 33% carbohydrate syrup, and a 6% protein - 20% carbohydrate whey fraction.

PB-243 936/2 PC A06/MF A01
Western Forest Products Lab., Vancouver (British Columbia).
Recent Advances in Foliage Utilization
J. L. Keays, and G. M. Barton. Feb 75, 105p* Rept no. VP-X-137
Summary in French.

Keywords: Vegetation, Feeding stuffs, Food supplements, Veterinary medicine, Decision making, Medicine, Food supply, Value, Food consumption, Cost analysis, Food processing, Utilization, Assessments, Food industry, Canada, *Food fortification, Muka, Global, Cosmetics, Foliage.

The primary purpose of the report to draw attention, at the decision-making level, to a little-known and neglected field of massive opportunity - foliage utilization. Foliage derivatives can be used in a wide range of products utilized in animal feeds, cosmetics, medicine, and veterinary practice. Of greatest immediate interest is the conversion of foliage to muka, used as a vitamin supplement in animal feeds. Of greatest importance on a global basis is the fact that every ton of foliage used in animal feeds can release one tone of grain to increase world food stocks. Foliage can be converted to muka in a few simple processing steps, at costs which should be competitive with alternative animal feed supplements. The potential value of muka manufactured in Canada could be in the hundreds of millions of dollars per year, and the addition to world food stocks in the millions of tons per year. In the case of muka manufacture and use, the problem is primarily one of assessment, recognition of opportunity, and application of developed technologies.

PB-244 263/0 PC A05/MF A01
Wisconsin Univ., Madison. Dept. of Botany.
Nutritional Ecology of Nuisance Aquatic Plants
Final rept. 28 Sep 72-31 Oct 74
Gerald C. Gerloff. Jun 75, 88p EPA-660/3-75-027
Grant EPA-R-800504

Keywords: *Aquatic weeds, Ecology, Nutritional requirements, Bioassay, Wisconsin, Lakes, Recommendations, Plants(Botany), Algae, Nutrients, Plant growth, Potassium, Phosphorus, Nitrogen, Tables(Data), Myriophyllum spicatum, Elodea occidentalis, Sea grasses, Aquatic weed control, Bioindicators.

Contents:
- Critical concentrations of essential elements in various aquatic plants;
- Comparisons of procedures for assaying nutrient availability in aquatic environments;
- Potassium as a growth-limiting nutirent for Myriophyllum Spicatum in a eutrophic lake;
- Competition for growth-limiting amounts of nutrients made available at very low concentrations in mixed cultures of aquatic plants;
- Growth of Elodea Occidentalis at low concentrations of inorganic nutrients made available in solution-replacement cultures;
- Comparisons of rates of phosphorus and rubidium uptake by several macrophytes and algae.

PB-244 294/5 PC A05/MF A01
Cornell Univ., Ithaca, N.Y. Program on Policies for Science and Technology in Developing Nations.
A Methodology for Formulating and Implementing Science Policy for a Small Developing Country (Costa Rica)
Franklin J. Ahimaz. Jun 75, 76p
Contract AID/csd-3391

Keywords: Developing countries, Policies, Scientific research, Foreign aid, Cooperation, *Costa Rica, Public opinion, Citizen participation, Regional development, National economic policies, Education, *Science policy, Limon Province(Costa Rica).

A review of current methodologies by larger developing countries decision-making bodies and international programs in developing nations has identified several approaches to policy formulation and implementation. These approaches are grouped and discussed. A new approach--the modified bubble-up approach to policy formulation and implementation--was initiated as a pilot effort in Limon Province, Costa Rica. Preliminary results indicate that this approach has promise for application to other small developing nations.

PB-244 557/5 PC A15/MF A01
Midwest Research Inst., Kansas City, MO.
Guidelines for the Disposal of Small Quantities of Unused Pesticides
Final rept.
Edward W. Lawless, Thomas L. Ferguson, and Alfred F. Meiners. Jun 75, 342p* EPA/670/2-75/057
Contract EPA-68-01-0098
Errata sheet inserted.

Keywords: Solid waste disposal, *Pesticides, Herbicides, Insecticides, Manuals, Decontamination, Waste treatment, Incinerators, Neutralizing, Oxidation, Reduction(Chemistry), Degradation, Management

planning, Classification, Toxicity, Water pollution control, Dust, *Waste disposal, Liquid waste disposal, Pesticide spills.

This study has compiled and organized information that will be useful to responsible authorities in advising the layman (particularly the homeowner and small farmer) how to dispose properly of small amounts of surplus and unwanted pesticides and pesticide containers, and in treating pesticide spills. The report brings together available information on pesticide disposal methods and on over 550 individual pesticides, and evaluates this information in terms of the experience and equipment that the average layman has. Fourteen pesticide disposal procedures are described and procedures for disposal of containers and cleanup and treatment of spills are included. Preferred and alternate disposal procedures are recommend for over 550 pesticides. The report includes a cross-index of over 1,600 pesticide names, tables showing the chemical composition and properties pertinent to disposal of the selected pesticides and bibliography of 166 references.

PB-244 668/0 PC-GPO
Soil Conservation Service, Washington, DC. Engineering Div.
Engineering Field Manual for Conservation Practices
Final rept.
Apr 75, 1075p* Rept no. SCS/ENG/FM-E

Keywords: Soil conservation, Water conservation, Surveys, Civil engineering, Manuals, Hydraulic structures, Irrigation, Drainage, Maintenance, Design criteria, Levees, Hydraulics, *Soil erosion, Terracing, Earth work, Strip cropping, Construction, Ponds, Construction materials, *Soil stabilization.

The manual was developed to provide guidance in the use of basic engineering principles, techniques and procedures for the planning, design, installation and maintenance of soil and water conservation practices. The material is limited to the types of conservation practices used most often and does not cover the more complex practices. The manual is intended primarily for use at the SCS field office level and is appropriate for both engineers and technicians. Standard survey practice is presented. A method of estimating runoff including necessary charts is included. Basic hydraulics and soil mechanics are discussed. Water disposal systems for erosion control and drainage are included. Development of water supplies by ponds, wells and springs is thoroughly covered. Construction and construction materials are also discussed. Each chapter includes appropriate tables, charts, curves and forms used in solving planning and design problems.

PB-244 691/2 PC A05/MF A01
Oklahoma State Univ., Stillwater. Dept. of Agricultural Engineering.
Improved Design and Operating Criteria for Rural Water Districts
Completion rept.
James E. Garton. Jun 75, 77p OWRT-B-028-OKLA(2)

Keywords: Water consumption, Rural areas, Design critera, Water supply, Dairies, Industrial water, Demand(Economics), Pumping, Oklahoma, *Water use, Water districts, Payne County(Oklahoma), Dairy industry.

Data were obtained on Rural Water Disrict No. 3, Payne County, Oklahoma. There was a significantly different pattern of usage for three classes of customers. The average monthly usage per tap ranged from 8768 to 19183 gallons for dairies, 4357 to 11983 gallons for Class A taps, and 2537 to 4160 gallons for Class B taps. The average monthly usage per person ranged from 1424 to 2821 gallons for Class A taps and from 989 to 1664 gallons for Class B taps. Optimal design values for peak demand ranged from: 1.0 to 1.5 gallons per minute per tap; 1.3 to 1.8 gallons per minute per Class A tap; 0.6 to 0.9 gallons per minute per Class B tap; 0.6 to 0.8 gallons per minute per person; 0.5 to 0.7 gallons per minute per person, Class A tap; and 0.3 to 0.6 gallons per minute per person, Class B tap. The optimal period off-peak pumping time is from 10 p.m to 7 a.m., a period of 9 hours.

PB-244 696/1 PC A02/MF A01
Arizona Univ., Tucson. School of Renewable Natural Resources.
Development of a Bibliographic Information System for Water Yield Improvement Practices
Project completion rept. Jul 72-Jun 75
Linda M. White, David B. Thorud, and Peter F. Ffolliott. Aug 75, 11p OWRT-A-042-ARIZ(9)
Contract DI-14-31-0001-3803

Keywords: *Water supply, *Water management, Bibliographies, Information retrieval, Watersheds, Forest land, Land use, Vegetation, Arid land, Evapotranspiration, Wildlife, Environmental impacts, Arizona, Water yield.

Development of the Watershed Management Information System (WAMIS) began in 1972. WAMIS is designed to serve a variety of users who are interested in water and natural resource research in Arizona. WAMIS is a computerized bibliographic reference retrieval system which provides literature searches for users, in the form of individualized computer printouts of citations and abstracts, based upon a user's special interests. The literature covered in WAMIS includes effects of land management practices and vegatation management on water and other related resources, such as forage production, wildlife habitat, timber production, and recreational use. Research done in Arizona has been emphasized. General procedures used in banking and retrieval are described. Types of search requests have varied, including topics such as wildlife use of ponderosa pine forests, environmental and vegetation effects on evapotranspiration, hydrologic modeling, Arizona water quality data, the effect of timber cutting practices on runoff, and revegetation of treated pinyon-juniper vegetation.

PB-244 880/1 PC A03/MF A01
New Mexico State Univ., University Park. Water Resources Research Inst.
Utilization of Water in a Semi-Arid Region
Technical completion rept.
H. D. Fuehring. Sep 75, 40p WRRI-059, OWRT-B-029-N.-Mex.(1)

Keywords: Water consumption, Farm crops, Semiarid land, Dry farming, Water conservation, Evapotranspiration, Surface water runoff, Grain sorghum plants, Nitrogen, Moisture, Field tests, Tables(Data), New Mexico, Southern High Plains Region(New Mexico), *Water use, *Arid land, *Agriculture, Water utilization, Atrazine.

A five-year study in the Southern High Plains (annual rainfall of 16 inches) using combinations of bare micro-watershed and growing bed widths resulted in increased crop yields on the growing beds as the proportion of micro-watershed was increased. However, yields for the entire area (including both bed and shed) decreased. Limited work indicated the possibility of also cropping the shed areas and it was concluded that this would be a more practical way of utilizing micro-watersheds. Grain sorghum and sunflowers were successful dryland crops on both beds and sheds while wheat was more suitable as a crop on the sheds rather than on the beds. The use of an antitranspirant (atrazine) gave promising results on grain sorghum but further work is needed.

PB-245 004/7 PC A02/MF A01
Youngstown State Univ., OH. Dept. of Civil Engineering.
Erosion Y Sedimentacion: Medidas Temporarias De Control (Suggestions for Temporary Erosion and Siltation Control Measures).
1975, 24p
Text in Spanish.

Keywords: Erosion control, Sedimentation, Highways, Developing countries, Slopes, Construction, Manuals, *Soil erosion, Diagrams, Efficiency, Latin America, *Roads.

The manual was prepared as an aid to field personnel engaged in the construction of highways in Latin America. It provides suggestions on the most efficient ways of providing emergency care against erosion and sedimentation by prompt treatment of the slopes. The booklet contains 24 pages of diagrams of various types of problems and methods of controlling them. The report was designed for distribution to the governments of Latin American countries through the cooperation of the Agency for International Development.

PB-245 083/1 PC A08/MF A01
Dynatech R/D Co., Cambridge, MA.
Fuel Gas Production from Solid Waste
Final rept. 28 Jun 73-31 Dec 74
R. G. Kispert, S. E. Sadek, L. C. Anderson, and D. L. Wise. 31 Jan 75, 167p Dynatech-1258, NSF/RA/N-74/268
Grant NSF-C827
See also PB-238 563.

Keywords: *Fuels, Energy sources, Manufactured gas, Reclamation, Solid waste disposal, Garbage, Anaerobic processes, Pilot plants, Design, Drawings, Cost analysis, Production rate, Materials recovery, Aluminum, Glass, Plastics, Regional planning, Fuel gas, Economic models, Computerized simulation, *Bioconversion, Solid wastes, Geographic locations, Refuse disposal, *Waste recycling.

Six major program tasks are discussed: (1) Preliminary engineering analysis and economic evaluation of a full-scale fuel gas from solid waste facility; (2) Pilot plant design, procurement, and initial operation; (3) Supporting laboratory experiments and studies at the University of Massachusetts and M.I.T.; (4) Confirmation of the economic model for the full-scale fuel gas from solid waste facility; (5) Evaluation and specification of a proof-of-concept pilot plant; (6) Application of the computer model to full-scale plant studies.

PB-245 128/4 PC A03/MF A01
California Univ., San Diego, La Jolla.
Proceedings of Conference on Enzyme Engineering as Related to Food and Energy Production, Held at the University of California, San Diego, on 22-25 July, 1974
William D. McElroy. 1974, 27p NSF/RA/T-74-012

Keywords: *Enzymes, Energy sources, Food, Meetings, Manufactured gas, *Methane, Photosynthesis, Water, Hydrogen, Biochemical fuel cells, Cellulose, Decomposition, Agricultural wastes, Nitrogen fixation, *Energy, Enzyme technology, immobilized enzymes.

The reports presents the conference's recommendations and summary background information for further research on enzyme engineering as related to food and energy production. Primary emphasis is in generation of methane, biophotolysis of water, efficient utilization of cellulose, biochemical fuel cells, nitrogen fixation, and the purification and stabilization of enzymes and enzyme systems.

PB-245 159/9 PC$9.50/MF$3.00
Portland Cement Association, Skokie, Ill.
Energy Conservation Potential in the Cement Industry
Conservation paper.
Jun 75, 344p* FEA/D-75/400
Contract DI-14-01-0001-1858

Keywords: Energy consumption, Fuel consumption, *Energy conservation, Portland cements, Kilns, Heat loss, Thermal efficiency, Energy requirements, History, Manufacturing, Economics, Industries, Japan, Europe, United States, Refractories, *Cement, Technology assessment, Heat consumption, Electric power consumption.

This study gives detailed background data needed to establish energy conservation objectives which are reasonable for the industry, to assess the potential for energy conservation within the industry, and to establish the probable impacts of certain levels and types of federal research, development, and demonstration support. It discusses basic materials, processes used in manufacturing, new technology available, and the controlling economics.

PB-245 176/3 PC A25/MF A01
Robert S. Kerr Environmental Research Lab., Ada, Okla.
Wastewater Use in the Production of Food and Fiber--Proceedings
Environmental protection technology series.
Jun 74, 590p Rept no. EPA/660/2-74-041
Proceedings of the Conference held at Oklahoma City, Oklahoma on March 5-7, 1974.

Keywords: Waste water, Water consumption, Aquaculture, *Irrigation, Meetings, Agriculture, Sewage treatment, Farm crops, Production, Forage grasses,

Salmon, Catfishes, Fiber crops, Public health, Disease vectors, Shellfish, Metals, Risk, Toxicity, *Fibers, *Waste water reuse, Water utilization, Heavy metals, Sewage irrigation, Public health.

An interdisciplinary group of about 200 persons met to review the present base of scientific knowledge relating to benefits and constraints of using wastewaters for production of food and fiber. There were 27 papers presented by representatives from the fields of public health, engineering, agriculture, aquaculture, and other related scientific disciplines. Papers in two sections on potential restraints cover topics such as historical instances of disease transmission, possible transport of microbial pathogens through the food chain, legal implications, and sociological reactions. The aquaculture section deals primarily with experimental studies including such diverse approaches as culture of daphnia, salmon smolts, and water hyacinth. The agriculture section emphasizes the use of wastewater for crop production and the papers presented include case histories for long-term operating systems, as well as data from experimental studies. In addition to those papers presented at the conference, nine others have been included to make a total of 36 papers in the conference proceedings.

PB-245 259/7 PC A07/MF A01
Colorado State Univ., Fort Collins. Environmental Resources Center.
Individual Home Wastewater Characterization and Treatment
Completion rept.
Edwin R. Bennett, and K. Daniel Linstedt. Jul 75, 148p Completion-60, W75-11852
Contract DI-14-31-0001-5006
Prepared in cooperation with Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.

Keywords: *Sewage treatment, Waste water reuse, Rural areas, *Septic tanks, Mountains, Aerobic processes, Residential buildings, Colorado, Domestic wastes.

Disposal of wastewater from isolated homes in mountain and rural locations in Colorado presents unique and difficult problems. The purpose of the study was to evaluate the flow and pollution patterns from individual homes and to evaluate existing and potential treatment methods. Field evaluation of home wastewater flow and pollutional characteristics was accomplished. Data for individual fixtures and appliances were obtained with measurement of many pollutional parameters. A brief evaluation of the home treatment methods was accomplished.

PB-245 318/1 PC A03/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
The Substitute Structure Method for Earthquake-Resistant Design of Reinforced Concrete Frames
Akenori Shibata, and Mete A. Sozen. Oct 74, 38p*
Rept nos. UILU-ENG-74-2027, Structural Research Ser-412
Grant NSF-GI-299934

Keywords: Concrete structures, *Reinforced concrete, Earthquake resistant structures, *Buildings, Framed structures, Columns(Supports), Beams(Supports), Earth movements, Design criteria, *Concrete, *Earthquake engineering, Ground motion.

From the observation that the inelastic response to earthquakes of reinforced concrete elements could be represented by a linear-response model, a procedure was developed in another report which incorporated the effects of inelastic energy dissipation to determine the design force for a single-degree-of-freedom structure using the ordinary linear-response spectrum. The substitute-structure method extends this procedure to multi-degree-of-freedom structures. The proposed method can be used to determine earthquake design-force requirements for individual elements of a R/C structure given a design linear-response spectrum and explicit decisions about tolerable inelastic response, with the option of different limits of inelastic response in different structural elements. The paper includes a numerical example demonstrating the determination design forces in a three-story frame and a series of analytical tests of the method using two- to ten-story frames.

PB-245 595/4 PC A13/MF A01
National Academy of Sciences, Washington, DC.
Arid Lands of Sub-Saharan Africa
Staff final rept.
1975, 286p*
Contract AID/csd-2584
See also PB-245 594.

Keywords: *Arid land, Developing countries, Foreign aid, Africa, Meetings, Chad, Mali, Mauritania, Niger, Senegal, Upper Volta, Communications management, Land development, *Agriculture, Livestock, Climatology, *Transportation, Industries, Sociometrics, Health, *SubSaharan Africa, Sahel(Africa).

A report is made on a 1974 conference on development problems in the Sahel, in Bellagio, Italy. The report is based on analysis and integration of ideas from a large number of proposals for development and aid to the nations of the Sahel. A survey and a critique are made of plans for development in the following areas: communication, transportation, dryland crop production, irrigated crop production, livestock and range production, technological and industrial developments, sociocultural and health developments, and institutional, policy, and economic structural development.

PB-245 609/3 PC A07/MF A01
Massachusetts Univ., Amherst.
A Survey of the Possible Use of Windpower in Thailand and the Philippines
William E. Heronemus. Nov 74, 143p
Contract AID/ta-c-1143
Prepared by Massachusetts Univ., Amherst. Dept. of Civil Engineering.

Keywords: Wind power, *Thailand, *Philippines, Windpowered pumps, Wind power generation, Windpower utilization, Windmills, Solar sea power plants, Irrigation, Electric power generation, Design, *Wind energy.

This work was performed in an attempt to answer the question: 'Could windpower be used by the peasant farmer in Thailand or the Philippines to improve the quality of his life.' It was found that windpower was being used to a very limited extent in Thailand to move water, thus relieving either a backbreaking manual labor task, or a very expensive out-of-pocket expenditure for fuel for engine driven pumps. No evidence of existing wind pumping could be found in the Philippines.

PB-246 392/5 PC A04/MF A01
Colorado State Univ., Fort Collins. Inst. of Rural Environmental Health.
A Study of Mosquito Prevention and Control Problems Associated with Stream Modification Projects
Final rept.
John R. Bagby. Oct 74, 57p*

Keywords: *Mosquitoes, *Pest control, Streams, Water resources, Design, Breeding, Swamps, Channel improvements, Site surveys, Disease vectors, Public health, Insect control, *Insects.

Recognizing the threat to public health by mosquitos and other arthropods this study provides methods and techniques that can be utilized in planning and design for modification of streams to reduce or eliminate the breeding areas.

PB-247 05[illegible]/3 PC A10/MF A01
Capital Systems Group, Inc., Rockville, MD.
Improving the Dissemination of Scientific and Technical Information: A Practitioner's Guide to Innovation
John M. Strawhorn, Richard L. Omerso, and William A. Creager. 15 Apr 75, 203p*
Contract NSF-C950
See also PB-243 461 and PB-243 469.

Keywords: Research, *Information services, Communications management, Distributing, Information systems, Improvement, Technology innovation, Publishing, Periodicals, Journalism, Computer programming, Errors, Automation, Design, Biproducts, Management methods, Printing, Reproduction(Copying), Marketing, Cost engineering, Trends, Requirements, *Research and development, Alternatives, Scientific communication.

The Guide's focus is on the 'primary' dissemination of scientific information: the technical journal or its equivalent. In other words, it deals with the initial recorded transmission of information. The Guide's contents are organized into sections, according to the degree of departure from conventional journal and monographic publishing. Each section is made up of a number of individual entries, describing particular innovations. So far as possible, these systems are separated into their individual components for treatment in separate entries, so that the reader who wishes to avoid radical change will not be forced to consider innovation in terms of conversion to a totally new system.

PB-247 079/7 PC A02/MF A01
Research Triangle Inst., Research Triangle Park, NC.
RANN Utilization Experience. Case Study No. 16. Transportable Solar Laboratory
R. LeChevalier. 1975, 25p NSF/RA/G-75-044
Grant NSF-C927
Also included in complete report and summary, PB-247 243. Prepared in cooperation with Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

Keywords: Technology transfer, Solar energy conversion, Solar space heating, Solar air conditioning, Laboratories, Test facilities, *Solar heating systems, Transportable Solar Laboratory project.

The primary objectives of the Transportable Solar Laboratory (TSL) project are to collect data on the performance of a solar energy conversion system, to test that system and its components in actual operation, and to communicate the potential of solar energy conversion systems to community leaders in education, engineering, science, government, and industry. The report briefly discusses use of the TSL.

PB-247 083/9 PC A05/MF A01
Transportation Systems Center, Cambridge, MA.
Nondestructive Testing System for Retreads
Final rept.
Henry H. Bessler, Stephen N. Bobo, Manuel J. Lourenco, and William R. Wade. Nov 75, 94p DOT-TSC-NHTSA-75-4, DOT-HS-801-736

Keywords: *Tires, Nondestructive tests, Ultrasonic tests, Test equipment, Inspection, Detection, Deterioration, Separation, Treads, Coverings, *Industrial plants, Ultrasonic inspection systems, Tire retreading, Retreaded tires, Tire casings.

An important problem in retreading tires is the assurance of a satisfactory casing. Since 1972 the National Highway Traffic Safety Administration has had under development an air-coupled through-transmission ultrasonic inspection system for finding anomalies in casings. The report describes the results of this development in sufficient detail to permit its reproduction by a reasonably competent electronics manufacturer. The reader is cautioned that the equipment described will not find all anomalies in every casing, and that system cost effectiveness depends heavily on the way the equipment is used, the tires it inspects, and the types of anomalies considered to be detrimental to retreading.

PB-247 098/7 PC A21/MF A01
Office of Water Research and Technology, Washington, DC. Water Resources Scientific Information Center.
A Selected Annotated Bibliography on the Analysis of Water Resource Systems. Volume 6
Daniel P. Loucks. Sep 75, 484p* Rept nos. OWRT/WRSIC-75-201, W76-01517
See also PB-235 336.

Keywords: *Water resources, Systems analysis, Bibliographies, Abstracts, Optimization, Mathematical models, Urban areas, Waste water, *Irrigation, Salinity, Management, *Arid land, *River basin development, Operations research, Indexes(Documentation), Water supply.

The report is an annotated bibliography consisting of 301 abstracts of selected publications issued in 1973 and 1974 pertaining to the application of systems analysis techniques for defining and evaluating alternative solutions to water resource problems. The first two volumes of the bibliography, having the same title, were published by the Cornell University Water Resources and Marine Sciences Center, Ithaca, New York (Publi-

cation 25, August 1969; Publication 35, June 1971); the third, fourth, and fifth volumes were published by the Water Resources Scientific Information Center in December 1972, December 1973, and July 1974, respectively. Both subject and author indexes are provided. Descriptors are listed with each abstract. The abstracted material emphasizes the application of optimization and simulation techniques for assisting the planning and management of water resource systems.

PB-247 182/9 PC A04/MF A01
Woods Hole Oceanographic Institution, MA.
Preliminary Results with a Pilot Plant Waste Recycling Marine-Aquaculture System
Technical rept.
John H. Ryther. Sep 75, 61p WH 5-41, NOAA-75103103
Grant NOAA-04-4-158-5, NSF 884
Sponsored in part by Grant NC 04-5-158-8.

Keywords: *Sewage treatment, *Waste water reuse, *Aquaculture, *Algae, Shellfish, Oysters, Lobsters, Flatfishes, Sea grasses, Nitrogen, Tropical regions, Feeding stuffs, Marine fishes, Diatoms, Field tests, Pilot plants, Sea Grant program.

A combined waste recycling-marine aquaculture system capable of complete nitrogen removal from treated domestic wastewater has been developed and tested on a pilot-plant scale over a one-year period. Effluent from secondary sewage treatment, mixed with seawater, is used to grow unicellular marine algae in large, continuous-flow, outdoor mass cultures. Harvest from the algae cultures is fed to oysters and other filter-feeding bivalve molluscs and to secondary crops of flounders or lobsters. Dissolved wastes produced by the animals are assimilated by cultures of commercially-valuable seaweeds. Successful cultures of unicellular algae, mostly diatoms, and seaweeds have been sustained over long periods of time (months) with only minor problems. Bivalve mollusc culture was unsuccessful during the first year of operation. An alternative nitrogen-removal system consisting only of seaweeds fed a continuous flow of secondary sewage effluent mixed with seawater has also been evaluated. Year-round operation would be possible in tropical to semi-tropical climates. In temperate climates, operation of the system is possible only on a seasonal basis.

PB-247 260/3 PC A03/MF A01
Research Triangle Inst., Research Triangle Park, NC.
RANN Utilization Experience. Case Study No. 17. Solar School Projects
P. Lawless. 1975, 26p NSF/RA/G-75-045
Grant NSF-C927
Also included in complete report and summary, PB-247 243. Prepared in cooperation with AAI Corp., Baltimore, Md., InterTechnology Corp., Warrenton, Va., and General Electric Co., Philadelphia, Pa. Space Div.

Keywords: Technology transfer, Solar space heating, Solar energy conversion, Schools, School buildings, *Solar heating systems.

In response to the energy crisis of 1973-74, NSF-RANN funded proof-of-concept experiments involving the use of solar energy to supply part of the heating required in four public schools. The purpose of the experiments was to demonstrate that solar heating is a technologically viable option in response to the shortage of fossil fuels. The report briefly reviews results of the experiments.

PB-247 429/4 PC A06/MF A01
Smithsonian Institution, Washington, DC. Office of International and Environmental Programs.
The Environmental Impact of Rapid Urbanization: Guidelines for Policy and Planning. Based Upon a Case Study of Seoul, Korea, in 1972-and 1973
Peter H. Freeman. 1974, 103p
Contract AID/csd-2608

Keywords: *Urban planning, Developing countries, Environments, Urbanization, Municipalities, Korea, Guidelines, Government policies, Local government, Handbooks, Air pollution, Environmental surveys, Waste disposal, Water pollution, Monitoring, *Environmental impacts, *South Korea, Seoul(Korea), Squatter communities.

Guidelines for preserving the environments of rapidly growing cities in developing countries are clearly needed. This document attempts to set forth such guidelines based largely on a case study of Seoul, Korea, as well as relevant examples from other large cities in the developing world. The guidelines are especially directed to cities whose urbanization has not advanced to the point that major decisions have already been made on large-scale infrastructural technologies, whose physical plans are still tentative and flexible, and whose slums or squatter settlements have not yet created the need to take emergency or remedial measures.

PB-247 430/2 PC A05/MF A01
Smithsonian Institution, Washington, DC. Office of International and Environmental Programs.
The Environmental Impact of a Large Tropical Reservoir: Guidelines for Policy and Planning. Based Upon a Case Study of Lake Volta, Ghana, in 1973 and 1974
Peter H. Freeman. 1974, 97p
Contract AID/csd-2608

Keywords: *Dams, *Lakes, Tropical regions, Developing countries, Ecology, Monitors, *Environmental impacts, Inventories, Surveys, Volta Lake, *Ghana.

The report summarizes all possible ecological and related physical environmental impacts of tropical dams and man-made lakes within a framework suited to the needs of the impact-assessment procedure. On the basis of the Volta Lake case study and other published experience, a brief narrative of likely impacts is presented. This is followed by key questions that should be asked to determine impacts. Data requirements and alternative methodologies (e.g., research, survey, inventory, evaluation, monitoring) are given to assist in the design of the assessment study.

PB-247 431/0 PC A07/MF A01
Smithsonian Institution, Washington, DC. Office of International and Environmental Programs.
Coastal Zone Pollution by Oil and Other Contaminants: Guidelines for Policy, Assessment and Monitoring in Tropical Regions. Based Upon a Case Study in Indonesia, in 1973
Peter H. Freeman. 1974, 144p
Contract AID/csd-2608

Keywords: Oil pollution, *Coasts, Tropical regions, Developing countries, Policies, Recommendations, Monitors, Bibliographies, Ecology, Prevention, Marine biology, *Indonesia, *Water pollution.

The report provides guidelines useful to tropical nations for the prevention and control of pollution of coastal waters by oil and other contaminants. It reviews the state of knowledge on the effects of pollution by oil in warm tropical waters, sets forth information needed for determining policies for controlling coastal zone pollution by oil, outlines several policy options and their implications and presents recommendations for monitoring coastal pollution. Included in the report is an Annotated Bibliography on the Biological and Ecological Effects of Oil Pollution in Tropical Waters.

PB-247 819/6 PC A05/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
Agricultural Machinery Development Program
Terminal rept. 1965-74.
21 May 75, 97p
Contract AID/csd-834, AID/csd-2541

Keywords: *Agricultural machinery, Developing countries, Cost engineering, Power supplies, Rice plants, Farm processing, Production, Farm crops, Economic factors, Tractors, Experimental design, Cultivation, Plows, Agronomy, Harvesters, *Philippines, Asia, *Rice.

The program provided a sharper focus on the development and commercialization of appropriate rice production and processing machines in the developing countries. The main objective of the US/AID/IRRI program was to provide simple agricultural equipment for small farms which could be manufactured by local metalworking firms in the developing countries. The program activities were divided in three major areas: (1) machinery design, (2) test and evaluation, and (3) economics of mechanization.

PB-247 970/7 PC E06/MF E06
New Mexico Univ., Albuquerque. Technology Application Center.
Wind Energy Utilization: A Bibliography with Abstracts. Cumulative Volume 1944/1974
Apr 75, 491p* TAC/W-75-700, NSF/RA/N-75-061

Keywords: Wind power, Bibliographies, Wind power generation, Wind turbines, Windmills, Windpower utilization, Windpowered generators, Windpowered pumps, Energy sources, Energy storage, Abstracts, *Wind energy.

To support research and development in resolving energy problems, the Technology Application Center, (TAC), through its Energy Information Center, has developed an energy information base which covers the broad spectrum of the energy field. To compile this bibliography on wind energy, the TAC staff retrieved and evaluated wind information from throughout the world. Significant sources included Scientific and Technical Aerospace Reports, Engineering Index, Government Report Announcements, Energy Abstracts, International Aerospace Abstracts, the Oklahoma State University Synopsis of Energy Research, among others. The bibliography substantiates that much of wind research, as it relates to energy considerations, was accomplished early in this century. Much research is yet to be done. This document includes an annotated bibliography by subject headings, an index of authors, index of corporate sources, index of titles, and index of keywords.

PB-248 135/6 PC A03/MF A01
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.
A Comparison of Organic and Conventional Farms in the Corn Belt
William Lockeretz, Robert Klepper, Barry Commoner, Michael Gertler, and Sarah Fast. Jul 75, 30p* CBNS-AE-6, NSF/RA/N-75-168
Grant NSF-GI-043890

Keywords: Farm management, Pesticides, *Fertilizers, *Agricultural economics, Prices, Environmental impacts, Farm crops, Profits, Fuel consumption, Economic factors, Production, Correlation techniques, Nitrogen, Phosphorus, Market value, Corn plants, Potassium, Income, Livestock, Inventories, Diesel fuels, Natural gas, Operating costs, *Pest control, Organic farming, Conventional farming, Corn Belt.

The widespread use of chemical fertilizers and pesticides has been credited with the high productivity of the U.S. farmer, but recent increases in the prices of these chemicals and concern about their ultimate environmental effect has raised questions about our continuing reliance on them. The paper reports a preliminary investigation of the crop production, profitability, and energy consumption of 16 organic and 16 matching conventional farms in the Corn Belt. This paper is a condensed version of a more detailed report, 'A Comparison of the Production, Economic Returns, and Energy Intensiveness of Corn Belt Farms That Do and Do Not Use Inorganic Fertilizers and Pesticides.' This report outlines the background of the problem, research methods, findings, results and implications of the study.

PB-248 217/2 PC$16.25/MF$3.00
Bureau of Reclamation, Washington, D.C.
Earth and Rock-Fill Dams Basis of Their Design and Construction. Second Edition
Sergei Nikandrovich Moiseev. 1975, 651p Rept no TT-72-58002
Trans. of mono. Kamenno-Zemlianye i Kamennonabrosnye Plotiny Osnovy Proektirovania i Stroitelstva, Moscow, 1970. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Earth dams, Rockfill dams, Construction, Design, Maintenance, Construction materials, Dimensions, Foundations, Deformation, Fluid filters, Labor estimates, Soil mechanics, Embankments, Moisture, Rocks, Reinforced concrete, Climate, Cold weather construction, Protectors, Translations, USSR, Books, *Dams.

The book discusses the design, construction, and exploitation of earth and rockfill dams, using local and foreign literature sources. Labor, construction materials, and equipment are discussed.

PB-248 257/8 PC A04/MF A01
National Academy of Sciences, Washington, DC. Committee on World Food, Health and Population.
Population and Food. Crucial Issues
Final rept.
Sep 75, 60p*
Contract NSF-C310

Keywords: Food, Populations, *Food supply, Agriculture, Nutrition, Population growth, Food storage, Foreign aid, Developing countries, International relations, Natural resources, Health, Nutritional deficiency diseases.

The report examines those elements that act as constraints on providing an adequate food supply to the worlds peoples, and certain ameliorative measures that might be taken to relieve those constraints. The report deals, in turn, with population; food and health; agricultural resources; factors such as affluence, climate, and aid programs; means to increase food supplies; and certain research priorities. It concludes with five general recommendations.

PB-248 297/4 PC A09/MF A01
North Carolina Water Resources Research Inst., Raleigh.
Water Supply and Wastewater in Coastal Areas: Proceedings of Southeastern Conference Held on April 2-4, 1975
James M. Stewart. 1975, 194p* NOAA-75120106
Also pub. as North Carolina Univ. Sea Grant reprint no. 83. Sponsored in part by Coastal Plains Center for Marine Development Services, Washington, D.C.

Keywords: *Water supply, *Water pollution, *Coasts, Meetings, Regional planning, Waste water, Reviews, Water quality management, Sewage disposal, Technology assessment, Land use zoning, Environmental impacts, Population growth, Economic development, Public health, Social welfare, Water resources, Sanitary engineering, Project planning, Ocean environments, Financing, Sea Grant program, Environmental protection.

The article details the proceedings of the southeastern conference on Water Supply and Wastewater in Coastal Areas. The Conference was conducted to review the state of the art of proper planning and management of water supply and wastewater disposal in coastal areas. Special attention was paid to defining technological and institutional alternatives, their relation to land use planning and environmental protection, and to identifying those water and wastewater problems of significance in coastal areas. A major problem that was discussed at the conference is associated with increasing population growth and economic development in these areas is the provision of safe and adequate water supplies and management of wastewater discharges in a manner consistent with public health and welfare and environmental protection. Both the presentations and discussion sessions are included in the report.

PB-248 338/6 PC A13/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Proceedings of the Conference and Seminar on Techniques and Methodologies for Stimulating Small-Scale Labor-Intensive Industries in Developing Countries, held at Atlanta, Georgia, on March 10-14, 1975
Donald E. Lodge, and Kay Ellen Auciello. Sep 75, 295p
Contract AID/CM/ta-G-73-18
See also PB-248 339.

Keywords: Developing countries, Economic development, Industries, Meetings, Technology, Methodology, Stimulation, Information services, Coordination, Project planning, Organizations, Projects, Businesses, Operations, Industrial relations, *Industrial development, *Small businesses, Case histories.

The principal goals of the conference were: -- To identify, analyze, and compare existing methodologies designed to stimulate small-scale industry; -- to disseminate knowledge about operational and linkage efforts; -- to establish the necessary links for coordination of future efforts of both the organizations in the developing countries and international development organizations, and -- to establish adequate feedback mechanisms for the present and future in order to enhance the design and utilization of the small industry program.

PB-248 339/4 PC A02/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Summary of the Conference and Seminar on Techniques and Methodologies for Stimulating Small-Scale Labor-Intensive Industries in Developing Countries, held at Atlanta, Georgia, on March 10-14, 1975
Summary rept.
Donald E. Lodge, and Kay Ellen Auciello. Sep 75, 25p*
Contract AID/CM/ta-G-73-18
See also PB-248 338.

Keywords: Developing countries, Industries, Meetings, Economic development, Stimulation, Technology, Methodology, Information systems, Projects, Surveys, Coordination, Planning, Businesses, Industrial relations, Operations, *Small businesses, Case histories.

The proceedings contain the addresses, papers and reports presented at the meeting, as well as discussion sessions. Conference and Seminar programs, a list of attendees and photographs are included. The conference was designed to present information on successful contemporary programs for the stimulation of small-scale industries in developing countries.

PB-248 346/9 PC A03/MF A01
Georgia Inst. of Tech., Atlanta.
Employment Generation Through Stimulation of Small Industries. Improving the Productivity of a Small Industry in Rural Korea
Research study Dec 73-Nov 74
Herbert Eller, Ross W. Hammond, and Ben E. James, Jr. Dec 74, 41p
Contract AID/csd-3175
See also PB-248 347.

Keywords: *Employment, Developing country, Industrial relations, Economic development, Productivity, Projects, Cooperation, Grants, National government, Universities, United States, *South Korea, Stimulation, International relations, Improvement, Recommendations, Industries, Businesses, Employment programs, Georgia Institute of Technology, Soong Jun University, International cooperation, *Small businesses.

As part of Georgia Tech's five-year program (US/AID-funded) to expand its existing capabilities in employment generation through small-scale industry development, a cooperative relationship was established with Soong Jun University in Korea. One of the first projects to be initiated by the two institutions was a joint staff research study of a small labor-intensive industry to determine how its productivity could be increased without displacing employment. Because of Soong Jun University's interest in starting an industrial engineering curriculum in its engineering school, it was decided the project team would take an industrial engineering approach in conducting this research effort.

PB-248 348/5 PC A03/MF A01
Georgia Inst. of Tech., Atlanta.
Employment Generation Through Stimulation of Small Industries
Annual rept. no. 1, 23 Feb 73-22 Feb 74.
22 Mar 74, 50p
Contract AID/csd-3175
See also Annula rept. no. 2, PB-248 349, and PB-248 347.

Keywords: *Employment, Developing countries, Industrial relations, Project, Universities, International relations, Organizations, Cooperation, United States, Asia, Africa, South America, Communicating, Economic development, Objectives, Grants, Financing, Industries, Businesses, *Small businesses, Georgia Institute of Technology.

The primary objective of this program is to strengthen Georgia Tech's demonstrated capability in employment generation through the expansion of the small industry sector. A major effort was made to seek out, establish, and maintain counterpart and communications networks. To this end, formal agreements to work cooperatively on programs of mutual interest were signed between Georgia Tech, five counterparts in Asia, Africa, and South America. It is intended that these counterpart organizations will provide data and a real-world laboratory for testing and validating industrialization methodologies, relevant training programs, applied small industry research, and the like.

PB-248 349/3 PC A05/MF A01
Georgia Inst. of Tech., Atlanta.
Employment Generation Through Stimulation of Small Industries
Annual rept. no. 2, 23 Feb 74-22 Feb 75.
Feb 75, 98p
Contract AID/csd-3175
See also Annual rept. no. 1, PB-248 348.

Keywords: *Employment, Developing countries, Industrial relations, Projects, International relations, Universities, Education, Economic development, Unemployment, Population migrations, Rural areas, Urban areas, Communicating, Management planning, Grants, Objectives, Industries, Businesses, *Small businesses, Georgia Institute of Technology, Rural to urban migration, Foreign countries.

The primary objective of this two-year-old program is to strengthen Georgia Tech's demonstrated capability in employment generation through the expansion of the small industry sector. This capability is particularly relevant to massive unemployment and rural-to-urban migration problems in many developing countries. The program is integral to the institutional commitment to international education and development.

PB-248 361/8 PC A02/MF A01
Agricultural Research Service, Washington, DC.
What Has Been Done in Peanut Breeding (Chto sdelano po Selektsii Arakhisa)
D. P. Umen. 1975, 12p Rept no. TT-74-52028
Trans. of Vsesoyuznyi Nauchno-Issledovatelskii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n5 p9-12 1933, by A. K. Dhote Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Peanut plants, Plant genetics, Peanut oil, Production, Maturation, Volume, Plant growth, Seasonal variations, Translations, *USSR, *Peanuts.

The industrial and agricultural importance of the peanut has led to an active interest and rapid development in this southern oilseed crop in many countries of the world. In particular much interest was shown in peanuts by the oil-extracting industry of the west-European countries and the USA. The report describes screening varieties for yield and high oil potential; and development of varieties usable as raw materials for the food industry, mechanized cultivation, yield, and early maturity

PB-248 362/6 PC A02/MF A01
Agricultural Research Service, Washington, DC
Technique of Artificial Hybridization in the Peanut (Tekhnika Iskusstevennoi Gibridizatsii Arakhisa)
D. P. Umen. 1975, 13p Rept no. TT-74-52017
Trans. of Vsesoyuznyi Nauchno-Issledovatelskii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n5 p29-33 1933, by A. K. Dhote Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Keywords: Peanut plants, Hybridization, Pollen, Removal, Plant genetics, Field tests, Plant reproduction, Plant tissues, Females, Translations, *USSR, Peanuts.

The report deals with the problems of technique involved in hybridization of peanut plants without going into the internal processes relating to the sphere of genetics. Applicable to any plant, this technique is determined by the structure of the flower and the biology of its development. In the peanut the technique consists of three stages, viz. emasculation, pollination and the operation on the inflorescences

PB-248 630/6 PC A16/MF A01
Smithsonian Institution, Washington, DC
Environmental Aspects of a Large Tropical Reservoir - A Case Study of Volta Lake, Ghana
Peter H. Freeman. Sep 74, 360p
Contract AID/csd-2608
Errata sheet inserted.

Keywords: Multiple purpose reservoirs, Developing countries, Volta Lake, *Environmental impacts, Economic development, Cost engineering, Project planning, Tropical regions, Power supplies, Rivers, Electric power plants, Surveys, Hydrogeology, Sewage treatment, Water supply, Food chains, Aquatic plants, Weed control, Sedimentation, Seismology, Water flow, Bathymetry, Mineral deposits, Salinity, Irrigation, Plankton, Fishes, Africa, *Lakes, *Ghana.

During 1973 the Smithsonian Institution's Office of International and Environmental Programs undertook a case study of the Volta Lake in Ghana. This was one of a series of case studies, carried out for the U.S. Agency for International Development, designed to better understand the environmental impacts of various development projects or situations. The purpose of these studies was to extract lessons which could be translated into guidelines to orient future development, in order to prevent costly and avoidable environmental impacts. The case study approach was chosen in view of the proven advantages of obtaining detailed understanding of a specific development. The Volta Lake was seen to constitute an excellent case study opportunity for a review of the environmental impacts of impounding a tropical river. Impacts in the impoundment area have been well researched and documented, and they are not dissimilar from the known impacts of other African man-made lakes. And like other hydropower schemes, the benefits have been very substantial.

PB-249 183/5 PC A05/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
Small-Scale Industry Grant: Soong Jun University Activities
Final rept. 10 Jan 74-9 Jan 75
Yoon Bae Ouh, and Nelson C. Wall. Jan 75, 76p
Contract AID/ta-C-1062
See also PB-249 184.

Keywords: Economic development, Businesses, *South Korea, *Employment, Technical assistance, Project planning, Information centers, Universities, Industrial training, Education, *Small businesses, Soong Jun University, Employment programs, Curriculum development.

The main objectives of the project are to generate employment outside metropolitan centers and to provide assistance to small-scale industries in selected areas in Korea. The report describes in detail the background, objectives, and activities of the program and outlines the results achieved and the conclusions reached by the project staff.

PB-249 184/3 PC A03/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
Small-Scale Industry Grant: Baseline Data-Areas of Brazil Served by Educational Foundation of South Santa Catarina
Jan 75, 27p
Contract AID/ta-C-1062
See also PB-249 185.

Keywords: Economic development, Technical assistance, *Brazil, Industries, Statistical data, Classifications, Economic surveys, Employment, Sales, Urban areas, Businesses, *Small businesses, Santa Catarina(Brazil).

This report consists of a series of tabular displays of data on the area to be served by the Education Foundation of South Santa Catarina (FESSC). The data include an identification of existing industry by classification, size, number of firms, number of workers, and total sales. Detailed information by industrial classification is provided for South Santa Catarina and the cities of Tubarao, Braco do Norte, and Laguna. Industry totals (number of firms, number of employees, and sales of industrial establishments) are given for each city within each of the two municipal association areas. In addition, population and land area data are listed for municipal association areas of Santa Catarina and for all cities within the two municipal association areas comprising the FESSC service area.

PB-249 185/0 PC A06/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
Small-Scale Industry Grant: Fundacao Educacional do Sul de Santa Catarina Activities
Final rept. 10 Jan 74-9 Jan 75
Jose Muller, and Nelson C. Wall. Jan 75, 112p
Contract AID/ta-C-1062
See also PB-249 188.

Keywords: Economic development, Businesses, *Brazil, Grants, Universities, Developing countries, Industries, Projects, Performance evaluation, Technology, Centers, Industrial training, Education, Organizing, Technical assistance, Management, *Small businesses, Santa Catarina(Brazil), Fundacao Educacional do Sul.

In 1974 the Agency for International Development (AID) funded a contract through which the Georgia Institute of Technology (GIT) was to make $45,000 grants for small-scale industry programs to two institutions of higher learning to be selected in different geographic regions of the world. This is the final (end-of-the-year) report for the work performed jointly by the staff of the Fundacao Educacional do Sul de Santa Catarina (FESSC) in Brazil and the Georgia Institute of Technology. Additional sections of this report describe the background, objectives, activities scheduled in the program of work, results achieved, and the conclusions reached by the project staff.

PB-249 186/8 PC A03/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
Small-Scale Industry Grant: Administration Project-Stimulating the Growth of Small-Scale Industry
Final rept. 10 Jan 74-9 Jan 75
Nelson C. Wall. Jan 75, 30p
Contract AID/ta-C-1062
See also PB-249 187.

Keywords: Economic development, Developing countries, Technical assistance, *South Korea, *Brazil, Projects, Universities, Grants, Surveys, Evaluation, Operations, Objectives, Industrial training, Education, Businesses, Industries, Stimulation, Criteria, *Small businesses, Fundacao Educacional do Sul, Santa Catarina(Brazil), Soong Jun University, Seoul(Korea), Georgia Institute of Technology.

The Agency for International Development (AID) funded a contract through which the Industrial Development Division (IDD) of the Engineering Experiment Station at the Georgia Institute of Technology was charged with the responsibility of implementing a specific program of work in the area of 'Stimulating Growth of Small-Scale Industry' by providing technical assistance grants to two counterpart institutions. The administrative portion of the contract was assigned the project number A-1600 by the contracting office at the Georgia Institute of Technology. This is the final report of Year 1 of this project which has been implemented in two different geographic regions of the world. The two selected counterpart institutions were Soong Jun University, Seoul, Korea, and the Fundacao Educacional do Sul de Santa Catarina, Tubarao, Brazil.

PB-249 288/2 PC A03/MF A01
Arizona Univ., Tucson.
Land Use Problems and Research Needs in the High-Altitude Zone of Ecuador
Edwin Lamar Smith, Jr, and Jack L. Stroehlein. Oct 75, 47p

Keywords: *Land use, *Ecuador, Land, Natural resources, Management, Watersheds, Wildlife, Irrigation, Vegetation, Soils, Developing countries, Forestry, Fisheries, High altitude.

The objectives of the study were: (1) to evaluate the nature and extent of problems associated with use of the high altitude lands of Ecuador, (2) to assess the significance of these problems and the possibilities of solving them through research and/or other types of projects, (3) to analyze priorities and capabilities of various institutions involved in natural resource development and management, and (4) to outline a program for solution of land use problems and identify those areas in which cooperation with external institutions is needed.

PB-249 368/2 PC A05/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Employment Generation Through Stimulation of Small Industries. Curricula Research and Development Held at Soong Jun University, Seoul, Korea on 21 April-8 June 1974
Herbert Eller. Jul 74, 87p
Contract AID/csd-3175
Paper copy also available in set of 3 reports as PB-249 366-SET, PC E99.

Keywords: *Employment, Industrial training, Universities, Engineering education, Developing countries, Surveys, Data acquisition, Korea, Meetings, Project planning, *Small businesses, *Training, *South Korea, Curriculum development, Soong Jun University, Georgia Institute of Technology.

As part of its program of research and guidance to counterpart institutions in developing countries under the auspices of an institutional grant from the U.S. Agency for International Development, the Georgia Institute of Technology sent the author to the Republic of Korea April 21-June 8, 1974. One of his activities was to determine the need for an industrial engineering curriculum at Soong Jun University and to advise the faculty on its development Meetings were held with the engineering college faculty, the president and his staff, and individual educators in various departments and areas of activity.

PB-249 462/3 PC A05/MF A01
Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment.
Guide to Energy Conservation for Food Service
Oct 75, 83p* Rept no. FEA/D-75/411

Keywords: *Energy conservation, Food services management, Manuals, *Food services, Food preparation, *Food storage, Illuminating, Space heating, Air conditioning, Ventilation, Food sanitation, Dishwashers, Water heaters, Stoves, Ovens, Refrigerators, Freezers, Maintenance, Planning, Industries.

The guide, developed by FEA and food industry representatives, offers energy-saving suggestions for all types of food service operations: schools and hospitals, fast food operators, coffee shops, restaurants, cafeterias, hotels, and motels. Energy conservation steps are identified for food preparation and storage, lighting, heating, ventilating, and air conditioning, and sanitation. The potential for savings are listed, with emphasis placed on increasing the efficiency of presently used equipment. Detailed steps to enable a food service manager to chart his fuel usage and monthly energy consumption, and to analyze the results of his conservation efforts are given.

PB-249 731/1 PC A08/MF A01
Agricultural Research Service, Washington, DC.
Cotton Boll Rot. Laying Out a Trial of a Method of Control (La Pourriture des Capsules du Cotonnier: Essai de Mise en Place d'une Methode de Lutte)
J. Cauquil. 1975, 152p* Rept no. TT-75-55027
Trans. of Coton et Fibres Tropicales (France), v28 n2,3,4 1973, by Margaret Duggan Saidi, and Lunde Paul. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Keywords: *Cotton plants, *Pest control, Fungus diseases, Bacterial diseases, Damage assessment, Fungi, Cell wall, Penetration, Resistance, Plant genetics, Vulnerability, Cell morphology, Fungus deterioration, Developing countries, Africa, Translations, France, Books, *Plants (Botany), Gossypium hirsutum, Boll Rot.

In recent years, progress in the cultivation of cotton has been very marked, thanks to the creation of productive varieties with good industrial qualities, and the use of chemical fertilizers and of the increase in the area of land protected against insects. Growers, however, remain defenseless against the damage caused by boll rot, which affects, on an average 10 to 20% of the fruit. The object of this study conducted mainly at the Central Station of the Research Institute for Cotton and Exotic Textiles at Bamben (Central African Republic) is to perfect a method of control to limit this damage. The present study proposes to define the different type of damage suffered by the fruit, to identify the organisms responsible and their mode of penetration, to define the obstacles the boll presents to the attack of parasites, and the principles of a method of control.

PB-249 929/1 PC A19/MF A01
Dubin-Mindell-Bloome Associates, New York.
Guidelines for Saving Energy in Existing Buildings. Engineers, Architects, and Operators Manual. ECM 2
Fred S. Dubin, Harold L. Mindell, and Selwyn Bloome. 16 Jun 75, 434p* FEA/D-CP-21
Contract DI-14-01-0001-1844
See also PB-249 928.

Keywords: *Energy conservation, Manuals, Commercial buildings, Space heating, Ventilation, Hot water heating, Refrigerating, Air conditioning, Heat recovery, Thermal efficiency, Illuminating, Solar space heating, Total energy systems, Solar water heaters, Cost estimates, Cost analysis, Economic models, Computer programs, Regulations, *Buildings, Solar water heating.

This report is intended for engineers, architects, and skilled building operators who are responsible for analyzing, devising, and implementing comprehensive energy conservation programs. It includes energy conservation measures which can result in further energy savings of 15 to 20% with an investment cost that can be recovered within 10 years through lower operating expenses.

PB-249 936/6 PC A05/MF A01
MITRE Corp., McLean, VA.
Wind Machines
Frank R. Eldridge. Oct 75, 85p* MTR-6971, NSF/RA/N-75-051
Grant NSF-AER75-12937

Keywords: Windmills, Wind turbines, History, Systems engineering, Site surveys, Design, Performance evaluation, Cost estimates, Windpower utilization, Wind power generation, Drawings, Photographs, *Wind energy, *Turbines.

This report provides a brief survey of the viability, history, taxonomy, and future potential of various types and sizes of wind machines that might be used to help meet future U.S. energy demands. It also discusses various applications of wind machines, as well as siting problems, performance characteristics, and system designs. A glossary of commonly used words and phrases, a list of suppliers, and a selected bibliography are included.

PB-250 448/8 PC A06/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.
Discussion Papers on Problems of Science and Technology. Annual Strategy and Planning Symposium, Agency for International Development, Office of Science and Technology Held at Atlanta, Georgia on May 6-9, 1975
Dec 75, 122p
Contract AID/ta-C-1194

Keywords: *Technology transfer, Economic development, *Research and development, Technology, Developing countries, Meetings, Education, Low income groups, Employment, Rural areas, Housing planning, Environments, Energy, Management methods, Food, Surveys, Reviews.

The Office of Science and Technology of the Agency for International Development periodically holds a symposium on the problems attendant to science and technology in the developing countries. The papers and group discussion summaries in this volume are the product of the third such meeting, held at the Georgia Institute of Technology, in Atlanta, Georgia. This meeting brought together a high-level multidisciplinary group of specialists from national and international agencies and institutions concerned with development policies, with the objective of reviewing past and prospective AID programs in science and technology.

PB-250 626/9 PC A05/MF A01
Eastern Associated Coal Corp., Everett, Mass Dept of Research and Development.
Development of a Non-Clogging Water Spray System
H. E. Harris, and R. E. Segien. 28 Nov 75, 98p
BuMines-OFR-36-76
Contract H0133047

Keywords: *Coal mining, Dust control, *Sprayers, Face preparation(Mining), Spray nozzles, Plugging, Fluid filters, Mining equipment.

Causes of water spray nozzle clogging on coal mine face machines were investigated and determined. This led to the design, development, and subsequent successful field testing and demonstration of a non-clogging water spray system. The non-clogging system was installed on three different continuous-mining machines. Followup tests showed that nozzle clogging was reduced by more than 90 percent. Also, on one section respirable dust concentrations were measured before and after the two periods, there was significantly more coal mined after the system was in operation.

PB-250 627/7 PC A05/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Development Div.
Small-Scale Industry Development in Paraguay
Case Study Mar 70-Jun 73
Nelson C. Wall. Feb 74, 93p Rept no. GIT-B-414
Contract AID/csd-3175

Keywords: Industrial mobilizing, *Paraguay, Regional planning, Developing countries, Investments, Urban areas, Rural areas, Organizations, Projects, Industries, Economic development, Stimulation, Exports, Networks, *Industrial development, *Small businesses.

The Industrial Development Division (IDD) of the Engineering Experiment Station at the Georgia Institute of Technology has recently completed a three-year program designed to assist the Ministry of Industry and Commerce of the Republic of Paraguay in its efforts to create a chain structure of regional development organizations, as well as to generate small-scale industries in rural-urban locations. The main objective of the project was to generate investments outside of the capital city of Asuncion and, if possible, to develop small export-oriented industries.

PB-250 628/5 PC A02/MF A01
Georgia Inst. of Tech., Atlanta. Industrial Developmont Div.
Employment Generation Through Stimulation of Small Industries. A Seven-Country Survey of Certification Licensing and Quality Marks Programs
Kenneth S. Stephens. Mar 75, 25p
Contract AID/csd-3175
See also PB-250 629.

Keywords: *Employment, Industrial relations, Thailand, Businesses, Manpower utilization, Developing countries, Questionnaires, Data acquisition, Industries, Stimulation, Standards, Licenses, Surveys, Project planning, *Small businesses, Certification.

The survey materials consisted of a relatively simple questionnaire and a package of related materials on the certification program of Thailand, including a completed questionnaire on the current Thai program to serve as a guide. The survey requested completion of the questionnaire together with supplementary materials on the certification programs under way in responding countries. The purpose of the survey was two-fold: (1) to obtain information on certification programs which would be helpful to Thailand in its efforts to establish and further implement its own program, and (2) to assist other countries in planning or further developing their efforts by giving them a comparison of the features of certification programs in various stages of development in other countries.

PB-250 629/3 PC A10/MF A01
Georgia Inst. of Tech., Atlanta, Industrial Development Div.
Employment Generation Through Stimulation of Small Industries. Small-Scale Industry Development in Ecuador
Case History Apr 73-Dec 74
Nelson C. Wall. Feb 75, 205p
Contract AID/csd-3175
See also PB-250 628.

Keywords: *Employment, Ecuador, Economic surveys, Businesses, Manpower utilization, Income, Production, Project planning, Stimulation, Industries, *Small businesses, Artisans.

This case history represents some 18 months of research carried out by the author on site in Ecuador in an attempt to get a first hand picture of the situation. Among the findings of this study are the following: Artisan enterprises and cottage activities employ well over 200,000 persons, who, in general, manage to earn enough to provide for a precarious existence. In most cases, the artisan performs his activity to generate additional income for his family needs. These persons would be better off with an industrial job if jobs were available. Great confusion and misunderstanding exist in the interpretation of the existing laws which govern artisans and small-scale industries. There is need for a well-reasoned, logical, pragmatic action plan which will address the present situation and assure obtainable goals over the next decade.

PB-250 662/4 PC A01/MF A08
National Bureau of Standards, Washington, D.C. Office of International Relations.
Testing and Certification for Export Products in Industrializing Countries
Final rept.
H. Steffen Peiser, and Robert S. Marvin. Feb 76, 171p Rept no. NBS-SP-438
Library of Congress catalog card no. 76-608023. Proceedings of a Regional Seminar held at the Regional English Language Centre and International House, Singapore on May 19-20, 1975.

Keywords: *International trade, Exports, Developing countries, Meetings, Standards, Industries, Regulations, *South Asia, Singapore.

A regional seminar sponsored by the Singapore Institute of Standards and Industrial Research, the National Bureau of Standards, and the Agency for International Development was held in Singapore in May of 1975. The participants represented most of the countries in south Asia concerned with increasing their exports, and concentrated on various problems connected with the testing and certification of such exports. Most of the prepared papers reviewed the practice and future plans of these countries. During the discussion a number of specific problems and issues were raised, with a good deal of attention focused on the extent to which the standards and certification of goods by an exporting country can be and are recognized by the importer. This report includes both the prepared papers and a mildly edited version of the discussions following each.

PB-250 848/9 PC A16/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
FY75 Progress Report on Design Criteria and Methodology for Construction of Low-Rise Buildings to Better Resist Typhoons and Hurricanes
Final rept. 1 Jul 74-30 Jun 75
Richard D. Marshall, and Noel J. Raufaste, Jr. Nov 75, 354p* Rept no. NBSIR-75-790
Grant PASA-TA(CE)-04-73
See also report dated 1 Jul 74, COM-74-11631.

Keywords: Tropical cyclones, Houses, Design criteria, Construction, Construction materials, Wind tunnel models, *Wind pressure, Technology transfer, Philippine Islands, Building codes, Developing countries, *Buildings, Natural disasters, Low rise buildings.

This report represents the major accomplishments conducted during the third phase (FY75) of a three year project to develop improved design criteria for low-rise buildings in developing countries to better resist extreme winds. The research study sponsored by the Agency for International Development commenced in March 1973. Two other reports were prepared; NBSIR 74-582 FY73 Progress Report (first phase of the research--4 months) and NBSIR 74-567 FY74 Progress Report (second phase of the research--12 months). During FY75, 6 major tasks were completed (instrumentation of fifth and sixth of six test houses to collect full scale field wind data, continuation of technician training at the field sites and at the wind tunnel facility, analyzed of extreme wind data, development of draft improved design criteria reports, participation in regional conferences in Manila and scheduling of regional dissemination of project results conference in Jamaica for November 1975). Research activities will be completed in December 1975. A final report will be published by the end of FY76.

PB-250 966/9 PC A10/MF A01
Utah State Univ., Logan. Inst. for Social Science Research on Natural Resources.

The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development
Wade H. Andrews, Rabel J. Burdge, Harold R. Capener, W. Keith Warner, and Kenneth P. Wilkinson. Jul 73, 218p OWRT-X-125(3752)(1)
Contract DI-14-31-0001-3752
Proceedings of the Conference of the University on Water Resources held at Logan, Utah on 10-12 Jul 73.

Keywords: *Water resources, Regional planning, Social effect, Meetings, Quality of life, Objectives, Government policies, Organizations, Management methods, Guidelines, Information systems, Project planning, Models, Rural areas, Urban areas, *Socioeconomic status.

Papers by academicians are reported dealing with concepts, measurements, and research findings, plus response papers from representatives of government and private organizations. Topics include the background of development of social wellbeing as a relevant value in planning and evaluation of water resources; problems in the political process in adopting social indicators and problems of organizing for needed research of a national character with thinly scattered personnel; methodology and some results in research relating to social goals; quality of life and water resources; an overview of theoretical and conceptual issues; and finally a synthesis of these elements concerning possibilities and conditions related to dealing with social well-being as a functional account in planning and evaluating water resources development.

PB-251 034/5 PC A15/MF A01
Iowa State Univ., Ames. Dept. of Economics.
Management of Water Quality Through Selected Institutions and Instruments
Doctoral thesis
Philippus Hendrik Spies. 1973, 346p OWRT-B-015-IA(5)

Keywords: Water quality management, Rural areas, Skunk River Basin, Allocations, Social effect, Decision making, Cost analysis, Water rights, Sediments, Economic factors, Erosion control, Prices, Theses, Iowa, *Water quality, Institutional framework.

The importance and interrelationships of planning, organization-coordination, and control of water quality management are analyzed as applicable to the water quality problem in a rural area. Spillover effects on water quality management are identified and evaluated in terms of efficiency and equity, by analyzing resource allocation within market and property systems. A model was developed for maximizing social benefits subject to specific water quality restrictions and applied to the Upper Skunk River Basin in Central Iowa. An institutional framework for water quality control was developed. Water quality planning may be simplified by application of charges to point source pollutants and standards to diffused pollutants. To allow for optimal planning and allocation of water qualities over time, it may be necessary to specify rights in water qualities by tenure contracts between public and user.

PB-251 094/9 PC A19/MF A01
Volunteers in Technical Assistance, Mt. Rainier, Md.
Manuel Technique du Village
6 Feb 78, 430p
Text in French. Trans. of mono. Village Technology Handbook, 1st edition, v1, v2 1963. Prepared in cooperation with Agency for International Development, Washington, DC. Communications Resources Div.

Keywords: Urban planning, Rural areas, Technology, Handbooks, Rural urban fringe, Agriculture, Sanitation, *Water supply, Housing planning, Grains(Food), Vegetables, Education, Telecommunication, Construction, Translations, *Food storage, *Handicrafts, *Housing, *Sewage disposal, *Roads, *Solar water heating, *Irrigation, Villages.

Village-level technology and plans cover the following topics: village water supply, sanitation, agriculture, grain and produce handling and preservation, housing and construction, home improvement, and education and communication.

PB-251 166/5 PC A02/MF A01
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Precipitation Management for Reclamation of Overgrazed Areas in Arid and Semi-Arid Regions
Completion rept.
Neil S. Grigg. Jan 76, 13p OWRT-A-026-COLO(1)
Contract DI-14-31-0001-5006

Keywords: Mine waters, Spoil, Vegetation, Precipitation(Meteorology), Strip mining, *Arid land, Semiarid land, Feasibility, *Environmental impacts, Land reclamation, Economic development, Wildlife, Social effect, Cost analysis, Management, Revegetation, Strip mine wastes.

An investigation was made of the feasibility of using precipitation management as a method for the vegetative restoration of strip mine spoils in arid and semi-arid areas, and for the economic and environmental improvement of reclaimed mine spoils. The procedure is believed to be capable of producing vegetative systems of higher economic and wildlife habitat value than exists naturally on these same lands or might be produced by other non-irrigated methods. It would appear that the cost of the necessary R and D program would be minimal, particularly when compared with the potential economic, environmental and social benefits which would accrue.

PB-251 192/1 PC A04/MF A01
Texas A and M Univ., College Station. Dept. of Agricultural Economics and Rural Sociology.
Utilization of Finfishes Caught Incidental to Shrimp Trawling in the Western Gulf of Mexico. Part II: Evaluation of Costs
John P. Nichols, Melvin Cross, Vito Blomo, and Wade L. Griffin. Jan 75, 51p TAMU-SG-76-203, NOAA-76020402
Grant NOAA-04-3-158-18
See also Part 1 dated Jun 74, COM-74-11809.

Keywords: Fishing, *Mexico Gulf, Marketing, Marine fishes, Value engineering, Prices, Marketing, Cost estimates, Merchant ships, Cost analysis, Shrimps, *Fishes, Sea Grant program, Finfishes.

The report presents estimates of the cost of operating several alternative systems for holding and landing finfish caught incidental to shrimp trawling operations. Freezer units, brine immersion tanks, an on-board fish meal plant, and extra crew member and a mother-ship concept are the systems evaluated. Break-even prices are estimated that would be necessary to cover operating costs and a 10 percent return on investment. Additionally, problems in traditional work patterns, crew incentives, and institutional arrangements are discussed. Comparison of estimated break-even prices with recent market prices indicate that none of the proposed systems are viable except under very restrictive conditions. The mother-ship or tender vessel concept shows the most economic potential but is plagued with problems of coordinating a large number of vessels in an industry where independence of operation is valued highly. The analytical model presented may be used to evaluate other systems not considered directly in this study.

PB-251 291/1 PC A[illegible]/MF A01
Ross Hofmann Associates, Coral Gables, Fla.
Evaluation of Small Modular Incinerators in Municipal Plants
Final rept.
1976, 155p EPA/530/SW-113c
Contract EPA-68-01-3171

Keywords: Air pollution, Incinerators, Solid waste disposal, Monitoring, Refuse disposal, Heat recovery, Steam heating, Cost analysis, Management planning, Urban planning, Fuels, Combustion, *Waste disposal, Air pollution sampling.

This report describes in detail the results of monitoring three small municipal incinerators, including one that incorporates steam recovery. The three incinerators tested were all under 50 TPD design capacity per furnace and were burning typical municipal solid waste. Cost information was accumulated for each facility and, where applicable, revenue from steam sales was included. Operational, performance, and environmental analyses were performed for all units involved. This report is the latest state-of-the-art report on small incineration, should serve as a guide for municipalities considering such a system, and can be used for comparison purposes in future solid waste system evaluations.

PB-251 377/8 PC A10/MF A01
Clemson Univ., S.C. Water Resources Research Inst.
Multi-Objective Water Resources Planning: Methodology to Achieve Compatibility Between Environmental Amenities and Economic Development
Completion rept. 1 Jul 72-30 Jun 74
David W. York, Benjamin C. III Dysart, and Lawrence W. Gahan. May 75, 224p* WRRI-55, W76-05840
Prepared by Clemson Univ., N.C. Dept. of Environmental Systems Engineering.

Keywords: *Water resources, Recreation, Economic development, Water supply, Industries, Water consumption, Benefit cost analysis, Mathematical models, Optimization, Management, Mineral deposits, Manufacturing, Mining, Great Santee Swamp, South Carolina, *Water management, Competing uses.

A mathematical model of multiple-use in natural areas was developed. The model represents a unified system for the evaluation of cases where traditional forms of economic development such as industrial manufacturing, suburban residential expansion, or mineral extraction are proposed for relatively natural areas having significant environmental amenity values. The model system is a unique benefit-cost analysis that allows for a rational comparison of the costs and benefits associated with both developmental and environment-related activities. The option value has been incorporated into the analysis, and methods have been devised for the estimation of desirability. The model was applied to a study of multiple-use management of the Great Santee Swamp in South Carolina.

PB-251 382/8 PC A04/MF A01
Economic Research Service, Washington, DC.
Decentralized Tomato Processing: Plant Design, Costs, and Economic Feasibility
Final rept. for 1974
E. V. Jesse, W. G. Schultz, and J. L. Bomben. Dec 75, 62p Rept no. USDA/AER-313

Keywords: Canneries, Tomatoes, Food processing, Design criteria, Economic factors, Industrial plants, Sites, Mathematical models, Size determination, Feasibility, Decentralization(Dispersal), Cost analysis, Investments, Industrial waste treatment, Operating costs, California, *Vegetables, *Food products.

Decentralized tomato processing merits consideration as an alternative to the conventional centralized operation, which processes fresh tomatoes into a finished product in a single factory. A study was made to determine savings that would be made if the cleaning and juicing operations were done at satellite locations in rural tomato growing areas and the final processing operations completed at existing canneries. The study used typical California growing, distribution, and factory methods. Economic feasibility was evaluated for satellites processing 50 tons per hour of fresh tomatoes into a pasteurized juice; the study used a modified Stollsteimer model for determining optimal size, number of plants, and location of the processing facilities.

PB-251 396/0 PC A21/MF A01
MITRE Corp., McLean, VA.
International Symposium on Energy, Resources and the Environment (5th) Held at Kuala Lumpur, Malaysia on 17-20 February 1975
M. Rifkin. Dec 75, 477p Rept no. M75-84
See also PB-219 952-SET.

Keywords: Energy, *Environmental impacts, Meetings, Natural gas, Petroleum, Malaysia, Indonesia, Philippines, Energy management, Energy source conservation, Energy reserves, Energy policy, Solid waste disposal, Reclamation, Economics, Agriculture, Fertilizers, Singapore, Australia, Thailand, Nuclear energy, Southeast Asia, Developing countries.

A partial listing of topic areas includes: The role of and need for technology in society; Economic development and prospects for mankind; Southeast Asia perspective; The place of energy in world peace; Dimensions of world energy; Nuclear energy infrastructure requirements; Energy scenarios for the future; Livestock and urban waste as future energy resources; Impact of energy resources on agriculture in a developing country; Energy, fertilizer and food; Resource management and international cooperation with special reference to Malaysia; National energy policy as it affects economic development.

PB-251 471/9 PC A06/MF A01
Carnegie-Mellon Univ., Pittsburgh, Pa. Interdisciplinary Working Party.
Feasibility Test of an Approach and Prototype for Ultra Low Cost Housing
Final rept. Dec 74-Aug 75.
Nov 75, 101p TA/OST-75-26
Contract AID/ta-C-1174

Keywords: Residential buildings, Socioeconomic status, Construction materials, Projects, Developing countries, Disasters, Rural areas, Cost analysis, Structural design, *Building materials, *Housing, Emergency housing, Disaster prone areas, Low cost housing, Indigenous materials.

This report outlines the activities in a housing effort to develop a prototype ultra low-cost housing unit for use in a variety of relief and rural development situations, especially in disaster prone areas of the developing countries. The structure is an 'A' frame modular housing system which can use a wide variety of local indigenous materials in a structure which is extremely cheap, labor intensive, easily erected, and wind and flood resistant.

PB-251 520/3 PC A04/MF A01
National Academy of Sciences, Washington, DC.
Natural Products for Sri Lanka's Future. Report of a Workshop Held at Colombo, Sri Lanka, on 2-6 June, 1975
1975, 61p
Contract AID/csd-2584
Prepared in cooperation with National Science Council of Sri Lanka, Colombo.

Keywords: Economic development, Developing countries, Ceylon, Meetings, *Natural resources, Planning, Project planning, Horticulture, Food industry, *Medicinal plants, Oils, Seasonings, Drugs, Recommendations, Workshops, *Sri Lanka, Essential oils, Spices, Underutilization, Exotic plants.

This final report is the product of a workshop jointly sponsored by the National Science Council of Sri Lanka (Ceylon) and the National Academy of Science of the U.S. The workshop's purpose was to identify scientifically sound projects that exploit natural products, that are realistic for Sri Lanka, and that can significantly contribute to the nation's economic and scientific development. This report, which has resulted from the joint deliberations of the Ceylonese and American workshop participants, presents a number of suggestions for improvement of ongoing programs, for marshalling latent resources, and for experimenting with new food and export crops. Suggestions and recommendations have resulted from the pooled knowledge and experience of all participants and are presented in several chapters that reflect the subject matter of the working sub-groups of the workshop.

PB-251 639/1 PC A08/MF A01
National Academy of Sciences, Washington, DC.
Systems Analysis and Operations Research: A Tool for Policy and Program Planning for Developing Countries
1976, 107p*
Contract AID/csd-2584

Keywords: Management engineering, Developing countries, Operations research, Economic development, Industrial engineering, Technical assistance, Theories, Operations, Definitions, Management methods, Organizations, Personnel development, Project planning, Facilities, Training, Social change, Economic factors, Technology transfer, Cybernetics, Regional planning, Policies, *Management techniques.

The report seeks answers to the questions: Do systems analysis and operations research (SA/OR) have relevance to the problems of developing countries. If so, how is an indigenous SA/OR capability developed. Accordingly the report attempts to provide an explanation of systems analysis methodology and limitations, illustrative applications of SA/OR in decision making, requirements for implementing SA/OR organization in developing countries, processes for training and criteria for producing needed personnel, and technical assistance opportunities.

PB-251 656/5 PC A09/MF A01
National Academy of Sciences, Washington, DC.
Underexploited Tropical Plants with Promising Economic Value
1975, 194p
Contract AID/csd-2584
Attached summary in French and Spanish.

Keywords: *Plants(Botany), Developing countries, Tropical regions, Market value, Nutritive value, Grasses, Grain crops, Vegetables, Bean plants, Fruit crops, Oilseed crops, Forage crops, Feeding stuffs, Livestock, Root crops, Leguminous plants, Requirements, Underexploited plants.

The report is on plants that shows promise for improving the quality of life in tropical areas. The report aims to provide a brief introduction to the plants selected. It is neither a textbook nor a comprehensive survey of tropical botany. The report does not detail how to introduce the plants to new areas. Readers should appreciate that achieving this goal may be complex and difficult. Many plants discussed in this report have defied dissemination (or domestication) for a century or more. Plant introduction cannot be divorced from plant management; a lack of horticultural knowledge or experience will frequently cause a plant introduction to fail. Differences in elavation, soil type, temperature, day length, and rainfall present other complications. Sometimes newly introduced plants prove to be too aggressive and become weeds. Even if all these problems are overcome, the plant will be successful only if a market exists or can be created.

PB-251 838/9 PC A11/MF A01
National Science Foundation, Washington, D.C. Div. of Advanced Energy Research and Technology.
Methods of Direct Conversion of Thermal Energy into Electrical Energy (Metodel Pryamogo Preobrazovaniya Teplovoi Energii v Electricheskuyu)
1976, 231p Rept no. TT-74-58065
Trans. of mono. Doklady Vsesoyuznoi Konferentsii po Ispolvzovaniyu Solnechnoi, Erevan, 17-21 June 1969, Moscow, 1969, Sektsiya C-3. (Reports of All-Union Conference on the Utilization of Solar Energy, Erevan, 17-21 June 1969), Sect. S-3. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Solar thermal power plants, *Solar collectors, Solar energy concentrators, Solar furnaces, Parabolic reflectors, Heliostats, Flat plate collectors, Mirrors, Solar energy absorbers, Translations, *USSR.

A partial listing of topic areas includes: The measurement of high temperatures in solar furnaces; Computation of the systems of concentrators-receivers; Automatic regulation systems of energy parameters of paraboloid helio-installations; Analysis of the heat transmission in autonomous accumulators of heat in solar energy plants; Investigation of cylindrical collectors in solar energy plants with a liquid metal heat transferring agent; Determination of the coefficient of thermal conductivity of materials for high temperatures collected in the focus of solar furnaces; Manufacture of parabolic concentrators by the method of centrifugal casting with subsequent extraction of galvanoplastic copies; Consolidation of galvanoplastic copies with the aid of glue compounds in the production of concentrators of solar energy; Paraboloid and parabolo-cylindrical concentrators on a base of mirror plates constructed from unpolished glass; Concentrators of radiant energy with open arc discharge as imitators of solar furnaces; Choosing the optimum focal parameters.

PB-251 843/9 PC A05/MF A01
National Science Foundation, Washington, D.C. Div. of Advanced Energy Research and Technology.
Methods of Direct Conversion of Thermal Energy into Electrical Energy (Metodel Pryamogo Preobrazovaniya Teplovoi Energii v Electricheskuyu)
1976, 96p Rept no. TT-74-58069
Trans. of mono. Doklady Vsesoyuznoi Konferentsii po Ispolzovaniyu Solnechnoi Energii, Erevan, 17-21 June 1969, Moscow, 1969, Sektsiya C-7. (Reports of All-Union Conference on the Utilization of Solar Energy, Erevan, 17-21 June 1969), Sect. S-7. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Solar energy, Solar radiation, Plant growth, Meetings, Irradiation, Photosynthesis, Sunlight, *Crops, *Vegetables, *Seeds, Plant genetics, Mutations, Corn plants, Tomatoes, Solar spectrum, Translations, *USSR.

Contents:
- Light impulsive irradiation and methods of its application in raising plant productivity;
- Photosynthesis--a process for transformation of solar energy to chemical energy;
- Utilization of solar energy by leaves and field crops;
- Photo-electric phenomena in chlorophyll solutions and some other substances;
- Photo-voltanic battery as a functional model of chloroplast;
- Electro-bio-illuminescence as a tool for estimating the effect of solar energy on biological objects;
- Stimulation of exchange of substances and productivity of pea as a result of pre-sowing irradiation of seeds, with impulsive concentrated solar light;
- Physiological and biochemical response of wheat grains to pre-sowing irradiation with concentrated sunlight impulses;
- A trail to obtain corn mutants through the action of concentrated sunlight impulses;
- Experience of applying the method of irradiation with impulsive concentrated sunlight on seeds of vegetables and melons;
- Photo-induced mutagenesis in tomatoes;
- Effect of the various regions of the solar spectrum on the quality characteristics of plants;
- Parabolo-cylindrical light impulse seed irradiator.

PB-251 890/0 PC A02/MF A01
Massachusetts Univ., Amherst. Water Resources Research Center.
The Effect of Land Use On the Chemical and Physical Quality of Surface and Ground Waters in Small Water Sheds
Martin E. Weeks. Sep 74, 13p Completion 74-7, Pub-41, OWRT-A-040-MASS(1)

Keywords: *Land use, Agricultural wastes, *Water pollution, South River Watershed, Inorganic nitrates, Fertilizers, Inorganic phosphates, Ground water, Surface waters, Nitrification, Cattle, *Water quality, Humus, Sewage, Lysimeters, Septic tanks, Massachusetts, Denitrification, Manure.

Results obtained from monitoring surface and ground waters gave only a qualified answer to the question of how to obtain some initial estimate of the effects of different land use patterns on water quality in the small watershed of South River. Agricultural wastes come largely from manure produced by the nearly 1100 head of cattle on the farms in the area, and from crop residues, and, to a lesser extent, from fertilizers used. The houses of residence, including those in Ashfield and Conway centers, contribute most of the effluents from septic tanks and considerable raw sewage directly to the South River. Eight stations were located at different places along the stream; water samples from the river at each of these stations were taken on a monthly basis for analysis. Low ground water phosphate concentrations were always found in lysimeters located in an area of the watershed where different soil management practices could be studied. No evidence of leaching was found from three field sites receiving moderate to sometimes heavy applications of manure and fertilizers.

PB-252 583/0 PC A12/MF A01
Jamison (Marshall), Washington, DC.
Satellite Educational System Costs for Three Model Developing Countries
Marshall Jamison, and Stephen T. Bett. Aug 73, 271p OTP-76/004c
Contract OTP-SE-73-208

Keywords: *Education, Radio communication, Television systems, Cost analysis, Instructors, Students, Learning, Programmed instruction, Developing countries, *Television, Satellite communications, Courses(Education).

The report is an investigation of the feasibility and cost-effectiveness of utilizing satellite technology to distribute educational and medical information in three developing countries.

PB-252 583/8 PC A20/MF A01
National Bureau of Standards, Washington, DC. Inst. for Applied Technology.

Wind and Seismic Effects - Proceedings of the Joint Panel Conference of the U.S.-Japan Cooperative Program in Natural Resources (6th) Held at National Bureau of Standards, Gaithersburg, Md. on May 15-17, 1974
Final rept.
H. S. Lew. Apr 76, 465p* Rept no. NBS-Special Pub 444
Library of Congress catalog card no. 76-608055.

Keywords: Structures, Earthquakes, *Wind pressure, Meetings, Dynamic structural analysis, Design criteria, Dynamic response, Gust loads, Wind(Meteorology), Volcanism, Earthquake resistant structures, Developing countries, *Buildings, Natural hazards, Natural disasters, *Earthquake engineering.

The Sixth Joint Meeting of the U.S. - Japan Panel on Wind and Seismic Effects was held in Washington, D.C., on May 15-17, 1974. The proceedings of the Joint Meeting include the opening remarks, the program, the formal resolutions, and the technical papers. The subject matter covered in the papers includes extreme winds in structural design; assessment and experimental techniques for measuring wind loads; dynamics of soil structures and ground response in earthquakes; structural response to wind and earthquakes and design criteria; disaster mitigation against natural hazards; and technological assistance to developing countries.

PB-252 685/3 PC A06/MF A01
Stanford Research Inst., Menlo Park, CA.
Residential Hot Water Solar Energy Storage Subsystems
Final rept.
Ellis E. Pickering. Jan 76, 117p* NSF/RA/N-75/095
Contract NSF-C905

Keywords: Heat storage, Residential buildings, Hot water heating, Water tanks, Storage tanks, Water storage, Insulation, Solar space heating, Solar air conditioning, Corrosion prevention, Design, Construction, Cost estimates, *Buildings, *Solar water heating.

Low-cost, efficient, and practical hot water solar energy storage subsystems for heating and cooling of residences are discussed. Both new and innovative vessel materials and configurations are investigated, together with insulation materials. Storage subsystem locations considered include basement, crawl-space, living space, garage, attic, surface exterior and underground exterior. Performance requirements for residential hot water storage systems are investigated. A matrix of advantages and disadvantages is constructed considering vessel material and configuration and location and type of residential construction. Other matters considered are corrosion control, costs, and development requirements.

PB-252 854/5 PC A03/MF A01
Transportation Research Board, Washington, DC.
Concrete Admixtures
J. F. Young. 1976, 44p* Rept nos. TRB/TRR-564, ISBN-0309-02474-9

Keywords: *Concrete, Cement additives, Setting time, Organic compounds, Hydration, Calcium silicates, Calcium inorganic compounds, Aluminates, High temperature tests, Porosity, Compressive properties, Alkali metal compounds, Carbonates, Sulfates, Calcium aluminates, Cement pastes, Lignosulfonates.

The papers in this Record include a review of the mechanism in which organic admixtures react with hydrating cement compounds; a discussion of the addition of water-reducing, set-retarding admixtures to concrete batches to shorten the setting time and workability time of concrete placed at high temperatures; a discussion of the influence of a water-reducing admixture on the quick setting experienced in certain white cements that contain less than 1.6 percent SO3; and a review of the use of admixtures in the production of low-porosity cement pastes and concretes.

PB-252 864/4 PC A06/MF A01
TRW Systems Group, Redondo Beach, CA.
Handbook for Pesticide Disposal by Common Chemical Methods
C. C. Shih, and D. F. Dal Porto. Dec 75, 103p* EPA/530/SW-112c
Contract EPA-68-01-2956

Keywords: Solid waste disposal, *Pesticides, Industrial waste treatment, Degradation, Detoxification, Hazardous materials, Chlorine organic compounds, Phosphorus organic compounds, Nitrogen organic compounds, Classification, *Waste disposal, Hazardous materials disposal, Liquid waste disposal.

This study is concerned with utilizing chemical degradation/detoxification methods for the disposal of small quantities of pesticide wastes. A primary objective of the study is to develop procedures to advise pesticide users of safe, readily available chemical methods for pesticide disposal. Another objective is to delineate the hazards associated with pesticide disposal by chemical methods, and warn the layman against the indiscriminate use of chemical disposal methods based on incomplete knowledge of the degradation products or the hazardous nature of the detoxifying reagents. Chemical degradation information on twenty different pesticides, representing each of the major pesticide classes, is discussed. Chemical degradation procedures that can be used by the laymen are described for naled, diazinon, Guthion, malathion, carbaryl, captan, and atrazine, but not for Dursban, methyl parathion, maneb, alachlor (Lasso), diuron, picloram, trifluralin, methoxychlor, chlordane, toxaphene, 2,4-D, amiben(chloramben), and pentachlorophenol.

PB-253 126/7 PC A03/MF A01
National Research Council, Washington, DC. Office of Chemistry and Chemical Technology.
Products from Jojoba: A Promising New Crop for Arid Lands
Final rept. 1973-75.
May 75, 36p*
Contract DHEW-OS-74-21

Keywords: Shrubs, *Arid land, Economic development, American Indians, Surveys, Distribution(Property), Byproducts, Oils, Esters, Waxes, Chemical composition, Utilization, Seeds, Chemical properties, Physical properties, Lubricants, Feeding stuffs, Waterproofing, Arizona, California, *Plants(Botany), *Crops, *Jojoba, Simmondsia chinensis, Jojoba oils.

The report is on a study made by the National Research Council's Committee on Jojoba Utilization. The project was initiated at the request of the Office of Economic Opportunity (OEO). OEO asked the National Academy of Sciences for scientific and technical advice regarding the feasibility of commercial development of products from jojoba as a possible economic resource for American Indians. The report contains a general survey of what is known about jojoba, highlights gaps in the present knowledge of the plant, and lists the conclusions of the Committee, including suggestions for future actions.

PB-253 369/3 PC A03/MF A01
Environmental Protection Agency, Washington, DC.
Project SAFEGUARD: Safe Pesticide Practices. Safety Handbook
1973, 38p
Prepared in cooperation with Department of Agriculture, Washington, D.C.

Keywords: Solid wastes, *Pesticides, Safe handling, Hazardous materials, Agriculture, Accident prevention, Hazards, Mixing, Protective clothing, Storage, Signs and symptoms, Handbooks, Waste disposal, Farms.

The report is a handbook which contains 12 lessons, each dealing with basic information about pesticide safety. The material explains the basic points of pesticide safety. The handbook is designed to present, in a simplified manner, rules for pesticide use for farmers and homeowners.

PB-253 652/2 PC A07/MF A01
Miami Univ., Fla. Sea Grant Institutional Program.
Preliminary Experimentation in the Development of Natural Food Analogues for Culture of Detritivorous Shrimp
Steven Y. Newell, and Jack W. Fell. Jul 75, 130p
Sea Grant Technical Bull-30, NOAA-76031605
Grant NOAA-04-5-158-14

Keywords: Shrimps, Feeding stuffs, Fungi, Wheat, Fermentation, Bagasse, Animal nutrition, Aquatic microbiology, Proteins, Food chains, Aquaculture, *Fishes, Sea Grant program, Penaeus duorarum, Penaeus setiferus.

A three year research program is described that has tested whether agricultural by-products can be inexpensively converted into fungal materials simulating the micro-bial-detrital complexes naturally eaten by several estuarine animals of commercial food value, including penaeid shrimp. If successful, a low-price feed could be developed to enhance commercial productivity of the shrimp. Fungal fermentations of agricultural by-products were conducted and attempts were made to optimize fungal protein production. Resultant artificial detrital feeds were tested on a proto-commercial scale in outgrowth of penaeid shrimp. Yields of shrimp ranged from very poor to encouragingly high, considering conditions imposed. Screening was begun of fungal capability to degrade the least expensive types of agricultural by-products, when these were modified to reduce lignin-associated refractoriness.

PB-253 787/6 PC E00/MF A01
Transportation Research Board, Washington, D.C.
The Bicycle as a Transportation Mode
Edward I. Koch, Daniel T. Smith, Jr, Robert D. Theisen, Carl E. Ohrn, and J. C. Oppenlander. 1976, 50p* Rept nos. TRB/TRR-570, ISBN-0-309-02483-8

Keywords: *Bicycles, *Transportation, Urban transportation, Routes, Design standards, Vehicular traffic control, Safety, Legislation, Intersections, Travel demand, Traffic safety, Citizen participation, Bikeways, Highway safety.

Contents: Bicycles and legislation; Planning and design of bicycle facilities--pitfalls and new directions; Planning and designing a demonstration bikeway; Predicting the type and volume of purposeful bicycle trips; Development of a planning process for a functional and recreational bicycle system; Establishing warrants for control of a bicycle crossing through simulation; Problems in integrating bicycle travel into the urban transportation planning process; Citizen participation in bicycle planning from the public agency's viewpoint--why and is it worth the effort; A highway safety standard for bicycle facilities.

PB-254 272/8 PC A02/MF A01
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Chemical Safety - Pesticides
Homer R. Wolfe. 19 Jul 74, 24p
Prepared in cooperation with Colorado State Univ., Fort Collins. Inst. of Rural Environmental Health. Proceedings of the Annual Conference of Environmental Chemicals - Human and Animal Health (3rd), Held at Fort Collins, Colorado, July 15-19, 1974.

Keywords: *Pesticides, Industrial hygiene, Hazards, Toxicology, Toxicity, Personnel, Education, Safety, Industrial atmospheres, Protective clothing, Protective coverings, Protective masks, Human factors engineering, Respirators, Exposure, Skin(Anatomy), Respiratory systems, Chemical industry, Occupational safety and health, Toxic substances.

People who become involved in activities requiring exposure to pesticides should be aware of the potential hazards involved as a result of absorption of toxic compounds. If a person is knowledgeable about such hazards and understands the importance of taking proper precautions, he can do much to insure the safety of himself and others. Although illnesses resulting from over-exposure to toxic compounds do occur among applicators and other workers, most are a result of carelessness or accident. Experience has shown that if proper precautionary measures are observed and directions on the pesticide label are followed, even the more toxic compounds can be used safely. Exposure to less toxic compounds should not be ignored.

PB-254 300/7 PC A16/MF A01
Texas Univ. at Arlington. Inst. of Urban Studies.
Alternatives in Energy Conservation: The Use of Earth Covered Buildings. Proceedings and Notes of a Conference Held at Fort Worth, Texas on 9-12 July 1975
F. L. Moreland. Jul 75, 352p* NSF/RA-760006

Keywords: *Buildings, Subsurface structures, Meetings, Environmental engineering, Cost analysis, Psychological effects, Ordinances, Building codes, Design standards, Esthetics, *Energy conservation, Energy consumption, Earth covered buildings.

These proceedings describe the conference held at the University of Texas in Arlington on the subject of the use of earth covered buildings to provide energy efficient buildings as well as a better physical environment. The potential for energy conservation by underground construction is great because of the need for fuel conservation due to depleting resources, and an increase in fuel consumption. Topics include: Historical Perspectives; Economics; Environmental Psychology; Energy and Materials; Examples of Earth Covered Buildings; City Patterns; Political and Legal Considerations; Technical Considerations. In addition, an extensive Bibliography on earth covered buildings is presented.

PB-254 379/1 PC **A06**/MF **A01**
Miami Valley Regional Planning Commission, Dayton, Ohio.
A Review of Critical Factors Impacting Regional Water Quality Management
Final rept.
Mar 76, 111p Rept no. EPA-208-MVRPC-M8
Report on Areawide Waste Treatment Management Report Program. See also PB-254 378. Prepared in cooperation with Environmental Protection Agency, Washington, DC. Div. of Water Planning, and Linton and Co., Inc., Washington, DC.

Keywords: Water resources, *Water quality, Water supply, Regional planning, Urban areas, Rural areas, Population growth, Employment, Land use, Solid waste disposal, Sewage treatment, Industrial waste treatment, Flood plains, Runoff, Legislation, Financing, Reviews, Ohio, Miami Valley Region(Ohio), Institutional framework.

The critical factors - experience, institutional arrangement, and legal and fiscal capabilities - for water quality management, previously discussed in separate reports, are brought together to describe the existing situation in waste treatment, water supply, land use controls, solid waste, storm water, and flood plain control in the Miami Valley (Ohio) area. The information, presented in a narrative with accompanying tables and matrices, is used in the development of the Section 208 (PL 92-500) Areawide Waste Treatment Management Plan.

PB-254 416/1 PC **A06**/MF **A01**
North Central Forest Experiment Station, St. Paul, Minn.
Intensive Plantation Culture. Five Years Research
Forest Service General Technical rept.
May 76, 122p* Rept no. FSGTR-NC-21

Keywords: *Forestry, Forest trees, Wood fibers, Yield, Density(Mass/volume), Plant growth, Harvesting, Plant physiology, Biomass, Nutrients, Pine trees, Fir trees, Plant diseases, Management, Economic development, Wood pulp, Viruses, Particle boards, Insects, Forest plantations, Maximum wood yield program, Populus, Spruce trees.

The report reviews 5 years of progress of the Maximum Fiber Yield program. Twenty separate papers describe achievements and plans for this multiproject program.

PB-254 469/0 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. Office of International Relations.
Regional Seminar on a System of Standardization and Metrology for Latin America
Final rept.
H. Steffen Peiser, and Robert S. Marvin. Feb 76, 100p Rept no. NBSIR-76-988
Grant PASA-TA(CE)-5-71

Keywords: *Metrology, Units of measurement, *Latin America, Meetings, Standards, Standardization, Information systems, Bolivia, Brazil, Networks, Telecommunication, Ecuador, Quality control, International relations, Food, Technical assistance, Thailand, Industries, Chemical analysis, Developing countries, Personnel development, Foreign countries.

This report contains the papers presented at the first of a series of Regional Seminars, organized under the technical guidance of NBS and sponsored by the U.S. Agency for International Development and the Direccion General de Normas y Tecnologia of Bolivia. The Seminar was held at La Paz on the 24th and 25th of June, 1974, with participants from Bolivia, Brazil, Chile, Ecuador, Korea, Peru, Turkey, Thailand, and the United States of America. The Seminar was organized into four sessions, each of one half day duration, covering: Session 1, 'Interactions for Information'; Session 2, 'Interactions for Standards'; Session 3, 'Interactions for Solutions to Technical Problems'; and Session 4, 'Interaction for Training'. Portions of this document are not fully legible.

PB-254 630/7 PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC.
Common Environmental Terms. A Glossary
Gloria J. Studdard. Nov 74, 25p

Koywords: *Environmental impacts, Dictionaries, Environments, Taxomony, Pollution, Terminology, Definitions, Problem solving, Handbooks, Glossaries.

The words and terms included in this glossary are used in discussing and writing about the environment. Included are certain common words which, while not peculiar to the environment, occur frequently in environmental literature and are important to a student's understanding of pollution problems. The glossary also explains the meaning of words such as dust and abatement as they apply to the environment even though definitions of such words are found in ordinary dictionaries. The object is to make available a single listing to compile and define the most common words and terms essential to the study, understanding and solution of environmental problems.

PB-254 845/1 PC **A03**/MF **A01**
Tamil Nadu Dept. of Education, Guindy (India).
Light Engineering Project for the Adult Blind
Final rept.
1965, 31p SRS-19-58120-001
Grant SRS-19-58120

Keywords: *Vocational guidance, Blindness, *Rehabilitation, Adults, India, Industries, Education, Projects, Handicapped persons, Vocational rehabilitation.

To encourage blind persons to become more independent from traditional charity and to enable them to participate in the rapid industrial development occurring in the Madras area of Tamil Nadu State, India, a 6-month rehabilitation program trained a total of 121 workers in shop and factory techniques. During the 4-year existence of the project, 51 trained clients obtained industrial jobs at salaries comparable to sighted workers. The project included workshop and 'on-the-job' training as well as training in travel and independent living skills.

PB-255 021/8 PC **A03**/MF **A01**
Kansas Water Resources Research Inst., Manhattan.
Swine Waste Digestion Enhancement with Nutrient Separation
Project completion rept. 1 Jul 74-30 Jun 75
Lawrence A. Schmid, and Ralph I. Lipper. Jun 76, 37p Contrib-173, OWRT-A-063-KAN(1)
Contract DI-14-31-0001-5016

Keywords: *Agricultural wastes, Digestion(Decomposition), Swine, Industrial waste treatment, Anaerobic processes, Waste water, Mixing, Separation, Ammonia, Stripping(Distillation), Removal, Carbon dioxide, Methane, pH, Anaerobic bacteria, Nutrients, *Biocon.ersion.

A swine waste anaerobic digester receiving the waste from 80 boars was operated for a period of ten months. Digester mixing and nutrient removal were accomplished by the recirculation of digester gases through two stripping units. Phosphoric acid was used to strip ammonia from the recirculated gas stream. Caustic solutions, primarily lime, were used to strip carbon dioxide. The removal of carbon dioxide resulted in an elevation of digester pH to 8.0. At the elevated pH ammonia was more readily stripped. A system specific ammonia desorption coefficient was determined which may be used for selecting gas flow rates. The selection of the proper gas flow rate can provide the required degree of ammonia removal to reduce ammonia concentrations to levels non-toxic to anaerobic bacteria.

PB-255 104/2 PC **A02**/MF **A01**
Institute for Building Science, Budapest (Hungary).
Some Aspects of the Construction of Industrial Projects in Developing Countries - Based on Hungarian Experience
Analysis of development, science organization, informatics bulletin
E. Csorba. 19 Dec 74, 15p Rept no. Bull-17

Keywords: Construction, *Technical assistance, Developing countries, Economic surveys, Economic factors, Manpower, Shortages, *Hungary, Prefabrication, Reinforced concrete, Planning, Design criteria, Technology transfer, *Buildings.

The need of developing countries for developing the industrial construction sector and obtaining technical assistance to achieve this objective in the fastest and most effective way is a well-known fact. Though there is a big variety in the conditions of various developing countries in different parts of the world, certain common factors appear in almost all cases. Many of these factors were characteristic for Hungary in the past three decades, and it can be helpful to see what could be used from the Hungarian experience in this field.

PB-255 137/2 PC **A03**/MF **A01**
Environmental Protection Agency, College, Alaska. Arctic Environmental Research Lab.
Alaska Village Demonstration Projects: First Generation of Integrated Utilities for Remote Communities
Oct 73, 36p Rept no. Working Paper-22

Keywords: Alaska, Sanitary engineering, Rural areas, Waste water, *Sewage disposal, Potable water, Sewage treatment, Regional planning, *Water supply.

The report describes the Alaska Village Demonstration Project which was authorized by Congress in 1970 to demonstrate methods of providing safe water supplies, toilets, bathing and laundry facilities, sewage disposal, and other similar facilities for remote Alaskan communities.

PB-255 146/3 PC **A08**/MF **A01**
Kraftco Corp., Glenview, Ill. Research and Dovelopment Div.
The Treatment of Dairy Plant Wastes
1973, 152p
Proceedings of Session on Upgrading Dairy Production and Treatment Facilities to Control Pollution Held at Madison, Wis., on 20-21 Mar 73.

Keywords: *Dairies, Water pollution control, Solid waste disposal, Industrial waste treatment, Concentration(Composition), Byproducts, Material recoveries, Performance evaluation, Sewage treatment, Process charting, Design criteria, Cost estimates, Water analysis, Food processing, *Water pollution, *Industrial wastes, Whey.

Contents:
- Current practices in the handling of dairy wastes--(Character of the wastes, Disposing of the effluent, Stockton, Illinois, Norwich, New York, South Edmeston, New York, Champaign, Illinois);
- The benefits of the joint treatment approach with the city--(Background, Wastewater treatment plants, The joint approach, The relationship with industry, Sampling and analyses, Summary);
- How Dean Foods handles the waste problem at the Chemung, Illinois dairy plant--(In plant controls, The waste treatment plant, The effluent load per 1000 pounds of milk, Performance of the treatment plant, Costs);
- Alternate methods of treating or pre-treating dairy plant wastes--(Dairy waste compatibility in municipal, Systems, Selection objectives, Treatment alternatives, Other wastewater treatment alternatives, Treatment methods - summary, Case histories, Kent Cheese Co., Eller Cheese Co., Alolkey Coop Cheese Co.);
- Foreign practice reprints--(Pre-treatment of dairy effluent by the Tower system, Biological treatment of dairy wastes, The treatment of creamery and yoghurt, Effluents, Spray disposal of food waste)

PB-255 444/2 PC **A04**/MF **A01**
Dana Larson Roubal and Associates, Pierre, S. Dak.

Irrigation Feasibility Study - Crow Creek Tribal Farm, Crow Creek Reservation, South Dakota
Engineering rept. 1976.
May 76, 55p
Grant EDA-05-06-01566
Prepared in cooperation with Crow Creek Sioux Tribal Council, Fort Thompson, S. Dak.

Keywords: *Irrigation, Economic development, Soil properties, Climate, Water quality, Farm crops, American Indians, Technical assistance, Feasibility, Cost estimates, Recommendations, South Dakota, Indian reservations, Sioux Indians.

The purpose of the study is to investigate and recommend whether irrigation should be used on the Tribal Farm of the Crow Creek Sioux Reservation. Geographical conditions, various proposed irrigation methods, cropping systems, and project phasing are presented for consideration. Estimated project costs are given and final recommendations made.

PB-255 447/5 PC **A10**/MF **A01**
Smithsonian Institution, Washington, DC. Office of International and Environmental Programs.
Coastal Zone Pollution in Indonesia - A Reconnaissance Survey
Apr 74, 203p
Contract AID/csd-2608

Keywords: *Water pollution, Oil pollution, *Coasts, *Indonesia, Developing countries, Ocean environments, Ecology, Fisheries, Estuaries, Harbors, Vulnerability, Sedimentation, Pesticides, Industrial wastes, Sewage, Dredging, Oil spills, Offshore drilling.

A number of catastrophic marine oil spills in the 1960's and in 1970 alerted the world to the hazards and impacts of marine oil pollution. In the same period, the emergence of other serious kinds of pollution sparked pollution control initiatives in many countries of the world. Environmental impacts associated with international development led to the undertaking of the present joint study on oil and other pollution in Indonesia's coastal waters. A survey was made of the impact of offshore oil exploitation.

PB-255 458/2 PC **A03**/MF **A01**
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.
Organic and Conventional Crop Production in the Corn Belt: A Comparison of Economic Performance and Energy Use for Selected Farms
W. Lockeretz, R. Klepper, B. Commoner, M. Gertler, and S. Fast. Jun 76, 49p* CBNS-AE-7, NSF/RA-760084
Grant NSF-AER-75-19031
See also PB-248135/6.

Keywords: Farm crops, *Fertilizers, Pesticides, *Agricultural economics, Grain crops, Corn plants, Output, Market value, Correlation techniques, Nutrients, Cost estimates, Manpower, Efficiency, Farms, *Pest control, Conventional farming, Organic farming, Energy use.

The report describes a two year study of fourteen pairs of crop-livestock farms in the Corn Belt, in which one member of each pair used only organic fertilization methods and no pesticides, while the other used conventional fertilizers and pesticides. Data are presented on the yields, production costs, and net returns of crop production on these farms for 1974 and 1975. Results also are given on the comparative energy consumption, labor intensiveness, and plant nutrient balance.

PB-255 605/8 PC **A12**/MF **A01**
Colorado State Univ., Fort Collins. Cooperative Extension Service.
Pesticide Chemicals. A Programmed Text
Max R. Uhlemann, Donald E. Moss, Charles O. Neidt, and Philip C. Minter. Apr 72, 251p

Keywords: *Pesticides, Agriculture, Books, History, Weed control, Herbicides, Plant diseases, Insects, Mites, Acaricides, Chlordan, Dieldrin, Livestock, Parasites, Chlorobenzenes, Questionnaires, Toxicity, DDT, Chlorohydrocarbons, Aldrin.

Contents:
Weeds;
Plant disease, Insects and mites of agricultural importance;
Insecticides and miticides;
Livestock pests.

PB-255 649/6 PC **A05**/MF **A01**
International Planning Management Corp., Bethesda, Md.
Small Business in the Metals Industry: A Background Study
Final rept.
24 May 76, 88p NSF/RA-76017
Contract NSF-Order-76-SP-0871

Keywords: Metal industry, Businesses, Economic surveys, Extractive metallurgy, Technology innovation, Management planning, Marketing, Reviews, Data acquisition, District of Columbia, Government policies, Commodity management, Metalliferous ores, Mining, Beneficiation, Raw materials, Foundries, Materials recovery, Solid waste disposal, *Steel industry, *Casting, Waste recycling, High technology industries, Service companies, Secondary materials industry, *Small businesses.

The objective of this study is to identify the principal small business roles in, and innovations of particular importance to, the metallurgical industry, together with associated planning and policy issues, marketing issues, and institutional arrangements. The scope of this study is confined primarily to the extraction and processing phases of the metals cycle. Extraction includes all stages prior to metal processing: mining, beneficiation of ores, reduction, smelting, and refining of the pure metals. Processing includes alloying, heat treating, rolling, casting, and fabrication. The role of small business in metals recycling and substitution is also considered but with less emphasis. The approach of the study combines literature review and letters of inquiry with personal interviews in the Washington, D.C. area. Three broad areas were identified in which small business is actively involved: high technology, service companies, and secondary recovery. A list of the individuals and institutions contacted is included in Appendix A, and a selected bibliography in Appendix B.

PB-255 882/3 PC **A18**/MF **A01**
Michigan Agricultural Experiment Station, East Lansing.
Crop Productivity - Research Imperatives, Summary of an International Conference on Crop Productivity Held on October 20-24, 1975, at the Boyne Highlands Inn, Harbor Springs, Michigan
A. W. A. Brown, T. C. Byerly, M. Gibbs, and S. San Pietro. 1976, 409p* NSF/RA-760176
See also PB-255 881. Prepared in cooperation with Charles F. Kettering Research Lab., Yellow Springs, Colo. Sponsored in part by Energy Research and Development Administration, Washington, D.C., and Department of Agriculture, Washington, D.C.

Keywords: *Food supply, Farm crops, Meetings, Production, Agricultural economics, Manpower, Plant genetics, Nitrogen fixation, *Pest control, Nutrition, Nitrogen, Carbon, Plant reproduction, Proteins, Microclimatology, Protection, Plant diseases, Soil water, Photosynthesis, *Fertilizers, *Crops.

An exploding population and an increasingly affluent society impose a more acute challenge to agriculture than ever before. The proceedings of this international conference reveal a concern for the continued adequacy of our food supply. The focus is on the fundamental biological processes that control productivity of economically important food crops. The proceedings continue with the discussions by four speakers on: 'World Productivity: Challenges to Science', 'Rice Responds to Science', 'Agricultural Productivity and World Nutrition', and 'Shooting At A Moving Target'. The conference work is conducted by six working groups. They address issues involving: Nitrogen Input; Carbon Input; Water, Soil, and Mineral Input; Plant Protection From Pests; Environmental Stress; and Plant Development Processes.

PB-255 911/0 PC **A05**/MF **A01**
Transportation Research Board, Washington, DC.
Transportation and Land Use Planning Abroad
Special rept.
Floyd I. Thiel, Teruki Kitamura, Yasumasa Torii, Allan K. Sloan, and Daniel L'Huillier. 1976, 83p* Rept nos. TRB/SR-168, ISBN-0-309-02487-0

Keywords: *Transportation, *Land use, Foreign countries, Noise reduction, Noise pollution, Financing, Public opinion, Pedestrians, Highway transportation, Urban transportation, Cargo transportation, Japan, Canada, Europe, Middle East, Developing countries, Metropolitan areas.

The papers discuss some of the ways that transportation and land use planning abroad is providing experience that can be helpful in the United States. Geographic areas from which experience is drawn include Japan, Canada, Europe, and the Middle East. Topics include noise and other transportation impacts, land use techniques to deal with these impacts, transit financing, public participation, 'pedestrianization' in various countries, pricing to restrain parking, truck regulation, highway needs in Canada, and transportation sensitivity considerations in developing countries.

PB-255 980/5 PC **A11**/MF **A01**
Social Action Research Center, Berkeley, Calif.
Program Development: A Manual for Organizational Self-Study
Judith Blanton, and Sam Alley. Aug 75, 230p
ADAMA-72-4
Contract PHS-HSM-42-72-143

Keywords: Organizations, Management engineering, Project planning, Manuals, Sequencing, Methodology, Human factors engineering, Services, Models, Development, Cycles, Feedback, Adaptive systems, Objectives. Organization theory, Personnel management, Purchasing, Scheduling, Revisions, Decision making, *Management techniques, Self study.

This manual was designed for organizations interested in self-development--in improving their planning, their use of resources, and learning from their successes and problems. It provides an example of a kind of situation one might face in attempting to implement that portion of the cycle and allows one to test his knowledge of the ideas presented in each chapter of the manual.

PB-256 067/0 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Low Cost Data and Text Communication for the Less Developed Countries. A Study with Special Reference to the Needs of The International Agricultural Research Centers
Ithiel de Sola Pool, Elliot Freedman, and Colin Warren. Jan 76, 150p*

Keywords: Telecommunication, Developing countries, *Agriculture, Data transmission, Cost benefit analysis, Technical assistance, Technology transfer, Cost factors, Low costs.

High technology systems of data communication including facsimile, computer polling systems, packet switching, and multiple access satellite systems are manageable in, and appropriate to the needs of the less developed countries. Use of such technologies can (1) markedly reduce costs for some important services, (2) locate activities in those centers where adequate maintenance and technical personnel exists, and (3) give the LDC's access to the best and most advanced technical information bases.

PB-256 103/3 PC **A02**
Rhode Island Univ., Kingston. Dept. of Resource Economics.
Optimizing the Growth and Marketing of Fish in a Controlled Environment
J. M. Gates, and J. J. Mueller. Jun 75, 7p Marine Reprint-52, NOAA-76050601
Grant NOAA-04-3-158-3, NOAA-04-5-158-6
Pub. in MTS Jnl., v9 n5 p13-16 Jun 75. Also pub. as Rhode Island Agricultural Experiment Station, Contrib-1611.

Keywords: *Fisheries, Aquaculture, Economic development, Marine fishes, Fishes, Marketing, Prices, Salmon, Growth, Sales, Optimization, Pumping, Feasibility, Heating, Operating costs, Mathematical models, Temperature, Controlled atmospheres, Linear programming, Tables(Data), Reprints, Sea Grant program.

The report assesses the economic feasibility of optimizing the growth and marketing of fish in a controlled environment. This report presents a linear program-

ming model in which processes are included for sales, growth, water pumping, and recruitment.

PB-256 128/0 PC A06/MF A01
Development Planning and Research Associates, Inc., Manhattan, Kans.
Feasibility Study of a Fish Processing Plant at Kotzebue, Alaska
Technical assistance rept.
Jun 75, 102p EDA-76-025
Contract C-4-36315

Keywords: *Food processing, *Fishes, Economic development, Salmon, Marine fishes, Technical assistance, Feasibility, Economic impact, Market research, Alaska, Cash flow, Kotzebue(Alaska), Fish processing.

The purpose of the report was to evaluate the economic and technical feasibility of replacing the present fish processing plant with a new facility at Kotzebue, Alaska. In the past three years, the Cooperative had to consider replacing the plant which was deteriorating. The economic impact of a new processing plant would be significant, therefore creating more jobs and an increased cash flow.

PB-256 406/0 PC A04/MF A01
United Indian Tribe of Western Oklahoma and Kansas.
Hog Bristle Processing By-Products and Paint Brush Manufacturing. A Feasibility Report
1976, 67p EDA-76-022
Grant EDA-08-601573-1
Prepared by General Research Corp., Oklahoma City, Okla.

Keywords: Economic development, Technical assistance, Manufacturing, *Brushes, Paint applicators, Bristles, Marketing, Product development, Revenue, Profits, Operating expenses, Oklahoma, Kansas, *Paints, *Industrial Plants, Hog bristles.

The report investigates the potential for the manufacture of natural bristle paint brushes and the potential for marketing bristle byproducts. The report also examines both the purchases of bristle on the open market and the use of bristle supplied by processing operations.

PB-256 460/7 PC A03/MF A01
Environmental Protection Agency, Washington, D.C. Resource Recovery Div.
Resource Recovery Plant Implementation: Guides for Municipal Officials: Further Assistance
1975, 34p Rept no. EPA-SW-157.8

Keywords: Economic development, *Urban planning, Materials recovery, Resources, *Waste recycling, Project planning, Industrial plants, States(United States), Community development, Systems engineering, Organizations, Economic assistance, Manuals, Technology innovation, Reclamation, Municipalities, Solid waste disposal, Solid waste management.

This publication is part of a special series of reports prepared by the U.S. Environmental Protection Agency's office of solid waste management programs. These reports are designed to assist municipal officials in the planning and implementation of processing plants to recover resources from mixed municipal solid waste. It deals with planning and management.

PB-256 461/5 PC A02/MF A01
Environmental Protection Agency, Washington, DC. Resource Recovery Div.
Resource Recovery Plant Implementation: Guides for Municipal Officials: Financing
1975, 25p Rept no. EPA-157.4

Keywords: Economic development, Materials recovery, Financing, Management planning, Decision making, Cost engineering, Capital, Solid waste disposal, Reclamation, Urban planning, Marketing, State government, Local government, National government, Government policies, *Waste recycling, Solid waste management.

This publication is part of a special series of reports designed to assist municipal officials in the planning and implementation of processing plants to recover resources from mixed municipal solid waste. It deals with financing, decision making, cost engineering, and capital formation.

PB-256 748/5 PC A02
Louisiana State Univ., Baton Rouge.
Agricultural By-Products as Supplemental Feed for Crawfish
Jonathan C. Goyert, James W. Avault, Jr, James E. Rutledge, and Teme P. Hernandez. 1976, 17p LSU-R-76-002, NOAA-76042105
Pub. in Louisiana Agriculture, v19 n2 p10-11 Winter 1975-76.

Keywords: *Fisheries, Feeding stuffs, Diets, Crayfishes, Farm crops, Byproducts, Food processing, Animal nutrition, Tables(Data), Reprints, Sea Grant program.

In the article is discussed the research that is being conducted to develop a diet for crawfish. The diet for this species would consist of agricultural by-products. A series of repeated experimental feedings have been conducted of which the results are included in tables.

PB-256 771/7 PC A03/MF A01
Bangladesh Univ. of Engineering and Technology, Dacca. Dept. of Civil Engineering.
Low-Rise Low-Cost Housing and Extreme Wind Related Problems in Bangladesh
Rept. no. 2
Jamilur R. Choudhury. Apr 75, 40p NBS-GCR-76-74
Contract NBS-4-35770

Keywords: Housing planning, *Bangladesh, Residential buildings, Socioeconomic status, Urban areas, Rural areas, Surveys, Requirements, Wind(Meteorology), Damage, Records, Foreign countries, *Buildings, *Wind pressure, Wind damage, Low cost housing, Low rise buildings.

This report furnishes information on socio-economic factors, the present conditions of urban and rural housing, and housing needs in Bangladesh for the next ten years. It also provides data on available wind speed records and wind damage statistics and discusses some special problems unique to Bangladesh.

PB-256 827/7 PC A06/MF A01
Southern Illinois Univ., Carbondale. Fisheries Research Lab.
Use of Zooplanktophagic Fishes in Channel Catfish Production Ponds
Completion rept. 16 Dec 74-15 Dec 75
William M. Lewis. Apr 76, 101p NOAA-76051206

Keywords: Catfishes, *Aquaculture, *Ponds, Zooplankton, Oxygen, Monitoring, Feeding stuffs, Abundance, Temperature, Biochemical oxygen demand, Depletion, Fresh water fishes, *Fishes, Ictalurus punctatus, Lepomis macrochirus, Ctenopharyngodon.

On basis of a report in the literature, and a previous study, it was postulated that unusually high populations of zooplankters might trigger oxygen depletion in catfish production ponds. To investigate this hypothesis, six ponds were stocked with fingerling channel catfish at a rate of 74, 130 fish/ha. The hybrid sunfish were added as zooplanktophagic fish on the supposition that they would prevent the development of a dense population of zooplankton and the effect of this could be measured by chemical monitoring. The hybrid sunfish appeared to have caused a change in the composition of the zooplankton, but their presence did not prevent oxygen from reaching critical levels. There is some evidence that they did affect the oxygen regime of the ponds, although not necessarily favorably. The most valuable observation resulting from the study related to oxygen production-consumption analyses based on sunrise-sunset readings. In general, it appeared impractical to stabilize oxygen in catfish production ponds without resorting to artificial oxygenation at selected times.

PB-256 901/0 PC A05/MF A01
Hittman Associates, Inc., Columbia, Md. Environmental and Geosciences Dept.
Erosion and Sediment Control Audiovisual Training. Instructor's Manual
Final rept.
Thomas R. Mills, Michael A. Nawrocki, George R. Squire, Homer T. Hopkins, and Michael L. Clar. Jun 76, 88p* EPA/600/8-76/001a
Grant EPA-S-800854
Prepared in cooperation with Maryland State Water Resources Administration, Annapolis, Soil and Water Conservation, Washington, D.C., and Federal Highway Administration, Washington, D.C. Office of Development.

Keywords: Erosion control, Sediments, *Education, Manuals, Objectives, Soils, Runoff, Plants(Botany), Soil stabilization, Construction, Inspection, Personnel development, Stream erosion, Forest land, Visual aids, Training devices, Books, Instructional materials, *Soil erosion, *Training.

A series of technical presentations and a certification plan for erosion and sediment control specialists are presented. Thirteen lessons complete with visual aids, student handouts and audiovisual handouts consisting of slides, vidiotape and tape narration, workbooks and instructor's manuals are developed. These materials are designed to provide an effective education program for qualifying construction personnel and others to pass a certification examination.

PB-257 357/4 PC A13/MF A01
National Research Council, Washington, DC. Committee on Renewable Resources for Industrial Materials.
Renewable Resources for Industrial Materials
James S. Bethel. Sep 76, 280p* NSF/PRA-1
Contract NSF-STP75-01069

Keywords: *Natural resources, *Forestry, Agriculture, *Energy conservation, Wood products, Farm crops, Cotton plants, Soybean plants, Elastomers, Leather, Hides, Algae, Fishes, Solid wastes, Refuse, Biomass, Textiles, Paper products, Paperboards, Farm management, Production management, Supply management, Energy management, Substitution, Renewable resources, Fuel substitution.

The concept of the Reference Materials System (RMS) is used as a framework for material assessment and, more specifically, to address the substitution of renewable materials for nonrenewables in particular end uses. The orderly and rational development of national goals for renewable resources requires the evaluation of alternative materials supply systems in terms of resource supply; available technology; and energy, manpower, and capital requirements.

PB-257 353/2 PC A04/MF A01
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Potential Increases in Food Supply Through Research in Agriculture. Constraints on Increasing Agricultural Production in the Tropics. Research and Implementation Needs
Final rept.
Edwin B. Oyer, Charles E. Hanrahan, Glenn H. Beck, J. Ritchie Cowan, and H. David Thurston. 31 May 76, 57p* NSF/PRA-4
Contract NSF-STP75-13988

Keywords: *Agriculture, Tropical regions, *Food supply, Research projects, Universities, Farms, Technology transfer, Soils, Natural resources, Plant growth, Inventories, Constraints, Water supply, Fertilizers, Seeds, Pesticides, Feeding stuffs, Animal diseases, Production, Tropical agriculture.

The report centers on researchable constraints which can be addressed immediately and, with reasonable inputs, be expected to produce production-increasing results in 5-10 yrs. Ennancement of prospects for technological innovation employing a described global network of agricultural research institutions is suggested. Techniques which will foster farmer-researcher participation in planned and structured research on farming systems of the tropics are called for as a means of increasing food production. Enhancement of efforts in the following areas are recommended: (1) evaluation and utilization of available germplasm in cropping systems, (2) inventory of soil resources and determination of amendments needed to produce adapted plants, (3) improvement of water and pest management practices and seed technology, and (4) utilization of ruminant animals in farming systems with attention to feed supplies, protection from diseases and increased productivity of the animals.

PB-257 362/4 PC A06/MF A01
New York State Coll. of Agriculture and Life Sciences, Ithaca.

Potential Increases in Food Supply Through Research in Agriculture. Increased Productivity from Animal Agriculture
Final rept. 1 Jun 75-31 May 76
N. L. VanDemark. Jun 76, 108p NSF/PRA-3
Contract NSF-STP75-13987

Keywords: Livestock, *Animal husbandry, *Food supply, Research projects, Feeding stuffs, Animal nutrition, Range grasses, Grains(Food), Production, Quality, Fossil fuels, Output, Mathematical models, Systems analysis.

There is a need for continuing emphasis on animal research since animal products contribute about half the nutrients in the US diet. Two-thirds of the feed energy used in producing these products come from inedible substances. Animal agriculture utilizes large acreages of range and other land unsuitable for crops for human consumption and uses huge tonnages of by-products and wastes that could be troublesome environmental pollutants. Excess food grains can be used when they are not needed for human consumption. Research is needed to (1) optimize the number of productive animal units, (2) increase food output per animal unit, (3) develop low fossil-energy subsidy methods of livestock production, (4) develop new feed resources, (5) improve animal product quality, and (6) evaluate animal production and biological systems by simulation modelling and systems analysis.

PB-257 404/4 PC A05/MF A01
Connecticut Resources Recovery Authority, Hartford.
Front End Recycling: A Study of the Economics of Recycling by Source Separation and Its Application for Fairfield County, Connecticut
Ronald Fattibene, and Irving Moy. Jun 76, 94p EDA-76-043
Prepared by Action for Bridgeport Community Development, Inc., Bridgeport, Conn.

Keywords: Solid waste disposal, Materials recovery, Separation, Management planning, Feasibility, Economic analysis, Glass, Cans, Tin coatings, Steels, Metal scrap, Aluminum, Newsprint, Questionnaires, Personnel, Connecticut, *Waste recycling, Secondary materials industry.

A one-year grant from the EDA to the Connecticut Resources Recovery Authority was allocated to the CRRA to examine the economics of recycling by source separation in Fairfield County. The purposes of the project was to assess the feasibility of a technology system for recycling by source separation and to determine the practicability of instituting such a system and the resulting economic impact of such an enterprise in Fairfield County. Factors to be explored in the course of the study were creation of new jobs, new business, cost benefits from the sale of recycled materials, and cost savings to communities. Conclusions and recommendations reflect the system as it existed at this writing.

PB-257 454/9 PC A05/MF A01
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Land Application of Wastewater In Australia. The Werribee Farm System, Melbourne, Victoria
Technical rept.
Belford L. Seabrook. May 75, 88p Rept nos. EPA/430/9-75/017, EPA/MCD-16

Keywords: *Sewage treatment, *Irrigation, Farms, Municipalities, Soil properties, *Land use, Rainfall, Arid land, Operating costs, Fertilizing, Waste water, *Australia, Flood irrigation, Sewage irrigation, Werribee Farm, Melbourne(Australia).

The report concerns the Werribee Farm soil treatment area operated by the Melbourne and Metropolitan Board of Works (MMBW). The Board (MMBW) was constituted in 1890 by an Act of the Parliment of Victoria to develop and operate a system of main and general sewerage for the metropolis. James Mansergh, an eminent sanitation engineer from London, submitted eight alternative schemes, five of which involved treatment by land. Mansergh stated that the Werribee site was situated for land purification of sewage because it was exceptionally dry and had an abnormally low rainfall compared with surrounding districts. His recommendation, based on proven success in England, and on the benefit of irrigation in an area of low rainfall, was for disposal by flood irrigation on prepared land without prior treatment of the sewage. Even today raw sewage is used at the Werribee Farm. The Werribee Farm soil treatment system is the outstanding project in Australia from the standpoints of the lowest annual operating costs, success, size and extent of experience with the use of wastewater effluents.

PB-257 550/4 PC$6.00/MF$3.00
Department of Agriculture, Washington, DC.
Selected Articles on Sugar Beet
1976, 150p Rept no. TT-70-57117/1-6
Trans. from various journals. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Sugar beets, Cultivation, Sugar crops, Plant growth, Plant nutrition, Fertilizers, Plant genetics, Yield, Sugars, Cell division, Plant physiology, Plant tissues, Translations, *USSR.

Contents:
- Scientific and technical progress in beet growing;
- Structure of sugar beet root under a different mineral nutrition regime;
- Characteristics of growth and cell division in high-sugar and high-yielding strains of sugar beet;
- Intake of root nutrition elements in sugar beet in the initial growth phases;
- Sugar content in sugar beet roots;
- Characteristics of sugar accumulation in various forms and strains of sugar beet and prospects of further increase in sugar content of sugar beet.

PB-257 530/3 PC A04/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Continuation of the Arizona Water Information System (AWIS)
Technical completion rept.
K. E. Foster, and K. J. DeCook. 1975, 55p OWRT-A-031-ARIZ(2)
Contract DI-14-31-0001-5003
Prepared in cooperation with Arizona Water Resources Research Center.

Keywords: *Water resources, Information retrieval, Data processing, Information systems, Hydrologic cycle, Ground water, Water quality, Systems analysis, Water supply, Data storage, Project planning, Abstracts, Regional planning, Colorado River Basin, Arizona, California, Nevada, *Information services, Hydrologic data.

The Arizona Water Information System (AWIS) was developed for storage and retrieval of water resources data and for dissemination of water resources information pertaining to the state of Ariz. Collectively, the AWIS system contains a number of distinct elements. The Activity File is a listing of water resource activities and projects dating from 1961, which can be accessed by keywords or by agency to retrieve abstracts and information on approximately 1,000 projects; the file recently was updated and additional projects covered in a regional program pertaining to the Lower Colo. River Basin portions of Ariz., Calif., and Nev.

PB-257 649/4 PC A03/MF A01
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Model Facility Plan for a Small Community, Supplement to: Guidance for Preparing a Facility Plan, Municipal Wastewater Treatment Works Construction Grants Program
Sep 75, 45p Rept no. EPA/MCD-08

Keywords: *Sewage treatment, Municipalities, Project planning, Facilities, Construction, Models, Grants, Federal assistance programs, Handbooks, Guidelines, Public utilities, Hypothetical communities, Application making, Federal Water Pollution Control Act Amendments of 1972.

Under the Federal Water Pollution Control Act Amendments of 1972, a municipality must prepare a facility plan as part of its Step 2 grant application for the construction of a wastewater treatment works. This model plan for a fictitious small, rural community supplements the Guidance for Preparing a Facility Plan, published in May 1975. The plan is provided for illustrative purposes only and should not be read as an ironclad guide to facility planning for small, rural communities.

PB-257 724/5 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Apply Pesticides Correctly. A Guide for Private Applicators
1975, 27p
Prepared in cooperation with Environmental Protection Agency, Washington, D.C. Pesticide Operations Div.

Keywords: *Pesticides, Manuals, Pest control, Spraying, Dusting, Insects, Weed control, Insecticides, Plant diseases, Safety, Calibrating, Equipment, Law(Jurisprudence), Regulations, Marking, Residues, Utilization.

Contents:
- Pests;
- Pest control;
- Pesticides;
- Labels and labeling;
- Using pesticides safely;
- Application equipment;
- Laws and regulations. Color illustrations reproduced in black and white

PB-257 801/1 PC A05/MF A01
Environmental Protection Agency, Washington, DC. Office of Solid Waste Management Programs.
Improving Rural Solid Waste Management Practices
Theodore L. Goldberg. 1973, 91p Rept no. EPA-SW-107

Keywords: Solid waste disposal, Rural areas, Management methods, Technology, Improvement, Recommendations, Effectiveness, Environmental surveys, Collecting methods, Processing, Storage, Organizing, Objectives, Transferring, Sanitary landfills, Equipment, Financing, Citizen participation, *Waste disposal, Household wastes.

This report surveys what has been done and can be done to raise the quality of solid waste management in rural America through existing technology. The aspects covered include planning for solid waste management; types of collection, processing, and disposal methods; means of financing systems; and citizen support. Although the priority in the report deals with handling wastes from rural residences, any methods discussed can be incorporated into handling commercial, industrial, or institutional wastes in rural counties and communities. Two problem wastes--agricultural wastes and abandoned vehicles--are not covered.

PB-258 003/3 PC E02/MF A01
Illinois Univ. at Chicago Circle. Dept. of Materials Engineering.
Cracking and Leakage Characteristics of Ferrocement Water Tanks
Interim rept.
Antonio J. Guerra, Antoine E. Naaman, and Surendra P. Shah. Sep 76, 62 Rept no. 76-3
Contract NSF-ENG74-20829

Keywords: Water tanks, Mortars(Material), Portland cements, Reinforcing materials, Wire cloth, Cracking(Fracturing), Leakage, Cost comparison, Cylindrical bodies, Structural analysis, *Ferrocement.

Cylindrical ferrocement tanks were subjected to increasing internal water pressures to study the influence of the reinforcing parameters on their cracking and leakage behavior. Based on the information generated in this investigation, allowable tensile stresses of about 30,000 psi in the steel are recommended for the design of virtually watertight ferrocement tanks. This allowable stress - which is almost twice higher than that recommended by the ACI Committee on reinforced concrete sanitary engineering structures - is used in a cost comparison study of water tanks made with ferrocement, reinforced concrete and steel. It is found that for current U.S prices, [illegible]ly dimensioned and designed ferrocement water tanks of up to 300,000 gallon capacity are cost competitive with reinforced concrete and steel tanks and would have at least equal performance.

PB-258 068/6 PC A03/MF A01
Environmental Protection Agency, Washington, DC. Div. of Water Planning.

Implementing 'Best Management Practices' for Residuals: The Waste Exchange
Alan K. Vitberg, Michael L. Rucker, and Christopher H. Porter. Jun 76, 31p Rept no. EPA/440/9-76/019

Keywords: Materials recovery, Benefit cost analysis, Utilization, Exchanging, Economic development, Residues, Solid waste disposal, Technology, Salvage, Water pollution abatement, Incentives, Industrial wastes, *Waste recycling, State planning.

This document presents an overview of a mechanism which can be used to facilitate the exchange of wastes, as is, from a generator to a user and its possible role in state and areawide residuals planning efforts. The premise is that many wastes contain valuable materials, some of which are in short supply. Extraction of materials from these wastes makes sense from both the conservational and the environmental points of view. Industry can dispose of its unwanted wastes and perhaps receive a monetary bonus. The waste receiver can potentially reduce costs for materials. In addition, the environment is saved from the introduction of potential pollutants from land and water disposal methods.

PB-258 403/5 PC A08/MF A01
Environmental Protection Agency, Washington, DC. Office of Water Programs.
Manual of Individual Water Supply Systems
1973, 159p Rept no. EPA/430/9-73/003
See also PB-215 81 i, and PB-258 402.

Keywords: *Water supply, Water distribution, Water consumption, Manuals, Sources, Ground water, Surface waters, Rural areas, Water storage, Pumping, Water treatment, Water wells, Bacteria, *Water quality, Disinfection, Ordinances, Water quality data.

Contents:
Selection of a water source;
Ground water;
Surface water for rural use;
Water treatment;
Pumping, distribution, and storage.

PB-258 499/3 PC A05/MF A01
Ebon Research Systems, Silver Springs, Md.
Fuel and Energy Production by Bioconversion of Waste Materials - State-of-the-Art
Silvia A. Ware. Aug 76, 78p* EPA/600/2-76/148
Contract EPA-68-03-0295

Keywords: Synthetic fuels, Solid waste disposal, Energy sources, Reclamation, Refuse, Cellulosic wastes, *Agricultural wastes, *Wood wastes, Solid wastes, Biomass, Fertilizers, Wastes, Cellulose, *Methane, Ethyl alcohol, Ethanols, Methyl alcohol, Fuel oils, Char, Anaerobic processes, Hydrolysis, Fermentation, Digestion(Decomposition), Cost estimates, Technology, Reviewing, *Bioconversion, *Waste recycling, Manure, Animal wastes, Refused derived fuels.

This report is a state-of-the-art summary of biological processes for converting waste cellulosic materials (agricultural, municipal and lumbering wastes) to fuels. It indicates the locations and quantities of suitable wastes and discusses the status of the current processing schemes. The processes discussed are: Acid hydrolysis followed by fermentation; enzyme hydrolysis followed by fermentation; anaerobic digestion of manure and municipal solid waste; and, biophotolysis.

PB-258 742/6 PC A08/MF A01
Industrial Environmental Research Lab., Cincinnati, Ohio. Food and Wood Products Branch.
Workshop on In-Plant Waste Reduction in the Meat Industry, Held at University of Wisconsin, Madison, December 13-14, 1973
Final rept.
Jack L. Witherow, and James F. Scaief. Sep 76, 151p Rept no. EPA/600/2-76/214

Keywords: Water conservation, *Waste water reuse, Meat, *Food processing, Meetings, Animals, Blood, Curing, Brines, Hair, Cleaning, Industrial wastes, By-products, Packing(Packaging), Beef cattle, Industrial plants, Removal, Reduction, Water pollution control, Livestock, Waste disposal, Meat industry, Slaughtering house wastes, Rendering plants, Slaughtering pens, Feedlot wastes, Offal wastes, Paunch.

Presented are the proceedings of a workshop on in-plant waste reduction in the meat industry. Forty-five participants from industry, government, and private firms exchanged ideas and experiences on waste reduction during the two-day session. Topics covered were: pens, blood conservation and processing, paunch and viscera handling, rendering and plant clean-up operations. Case histories are presented on water conservation in a meat packing plant and in a hog processing plant.

PB-258 842/4 PC A11/MF A01
California Univ., Berkeley. Earthquake Engineering Research Center.
The Seismic Behavior of Critical Regions of Reinforced Concrete Components as Influenced by Moment, Shear and Axial Force
Mehmet Bilgin Atalay, and Joseph Penzien. Dec 75, 250p Rept no. EERC-75-19
Grant NSF-AEN73-07732-A02

Keywords: *Buildings, *Concrete, Earthquakes, Columns(Supports), Girders, Loads(Forces), Deformation, Stiffness, Mathematical models, *Reinforced concrete, *Earthquake engineering.

Building response caused by moderate to severe earthquake excitation is often in the inelastic range; thus, to enable reliable predictions of overall performance, the energy absorption and failure characteristics of individual components must be established. For reinforced concrete frame buildings, the critical or yielding regions may occur in either or both the girders and columns subjected to various combinations of bending, shear, and axial load. To determine the characteristics and modes of failure of columns under excitations causing degradations in stiffness, strength, and energy absorption, a series of twelve members simulating a column between inflection points above and below a floor level were designed and tested dynamically. The variable parameters introduced were (1) magnitude of applied axial load chosen to represent lower, intermediate, and upper story columns, (2) lateral reinforcement percentage chosen to study the influence of confinement on ductility, and (3) history of controlled lateral displacement chosen to determine the effects of rate and sequence loading.

PB-259 000/8 PC E11/MF E11
National Technical Information Service, Springfield, VA.
Integrated Energy Vocabulary
1976, 459p*
Sponsored in part by National Science Foundation, Washington, D.C. Prepared in cooperation with Battelle Columbus Labs., Ohio, Energy Research and Development Administration, Washington, D.C., and California Univ., Berkeley. Lawrence Berkeley Lab.

Keywords: Subject index terms, *Energy, Terminology, Words(Language), Thesauri, Information retrieval, *Information services, Data bases.

The Integrated Energy Vocabulary is a compilation of some 30,000 scientific and technical terms covering the broad subject of energy R&D. Ten different information system vocabularies were used as sources of terms. The date of coverage was through 1973. The primary purpose of this vocabulary is to assist seekers of energy information with: (1) Search strategy formulation using energy terminology appropriate to the data base(s) to be searched (finding the right term); and/or (2) Determining which data base(s) or information system(s) to search with a given energy term (finding the right data base). This product should be useful in the following additional applications: (1) As a guide for indexing energy-related documents; (2) As a reference tool for developing microthesauri on energy R&D; (3) As a reference tool for further studies of vocabulary compatibility and convertibility.

PB-259 129/5 PC A09/MF A01
Little (Arthur D.), Inc., Cambridge, MA.
Energy Efficiency and Electric Motors
Final rept.
Robert E. Hunt, Frank Seabury, and Philip F. Valence. Aug 76, 188p* ADL-78537-FR, FEA/D-76/381
Contract FEA-CO-04-50217-00
(PC A09/MF A01)

Keywords: *Electric motors, *Energy conservation, Electric power consumption, Utilization, *Industrial plants, Selection, Trends, Efficiency.

The report identifies areas of greatest energy conservation potential in electric motor use in the industrial and commercial sectors of the economy; assesses and projects the technological potential and economic trends that might influence the use of more efficient electric motors; and outlines possible Government strategies encouraging such use. It reports that the 1- to 125-HP polyphase motors were the predominant energy consumers, accounting for about 26 percent of the total electric power generated in the U.S. Estimates of their potential for increased efficiency, coupled with possible replacement rates of lower to higher efficiency motors, indicated potential savings by 1990 of 35 billion kWh/year--or 60 million barrels of oil.

PB-259 146/9 PC A09/MF A01
Associated Water and Air Resources Engineers, Inc., Nashville, Tenn.
Handbook for Monitoring Industrial Wastewater
Aug 73, 191p EPA/625/6-73/002
Also available from Environmental Protection Agency, Office of Technology Transfer, Cincinnati, Ohio 45268.

Keywords: Water analysis, *Industrial wastes, Monitoring, Handbooks, Waste water, Measuring, Samplers, Profiles, Turbidity, Weirs, Flumes, Flow measurement, Automation, Flow charting, Industrial plants, *Waste water, Water pollution sampling, In plant processes, Water pollution detection.

The handbook for industrial wastewater monitoring comprises a compilation of information for use and reference in planning, executing, and continuing a program of industrial wastewater monitoring. Philosophy of monitoring needs, planning, supply measuring, and analysis is presented for familiarization by industrial plant managers. Sufficient detail is given for those who wish to explore more deeply some of the practical and theoretical aspects of any of the phases of a monitoring program.

PB-259 318/4 PC A08/MF A01
Institute of Gas Technology, Chicago, IL.
Wind-Powered Hydrogen Electric Systems for Farm and Rural Use
Final rept. May-Dec 75
Raymond R. Tison, Nicholas P. Biederman, Timothy Donakowski, Robert H. Elkins, and Jon B. Pangborn. Apr 76, 171p ERDA/NSF-00772/75/1
Grant NSF-AER75-00772

Keywords: Wind power generation, Systems analysis, Systems engineering, Farms, Rural areas, Electric power consumption, Electric power demand, Electrochemical power generation, Storage batteries, Hydrogen-based energy, Fuel cells, Electrolysis, Hydrogen, Inverters, Energy storage, Computerized simulation, Computer programs, FORTRAN, *Wind energy.

Preliminary designs for wind-energy conversion systems supplying the total energy needs of selected farms and a rural home are synthesized. The concept is a fully dedicated system whose components and subsystems are off-the-shelf technology. The principal subsystems and components are: (1) input (wind turbine, electrolyzer, and rectifiers); (2) storage (batteries, and storage tanks of hydrogen and hot water); and (3) output (inverter, motor generator, engine generator, and fuel cell). Two methods of energy storage are evaluated for use and subsequently form the bases upon which each design is optimized. It is shown that wind-energy systems based on battery-storage systems are: (1) simpler to construct and maintain; (2) more efficient; and (3) less expensive than those based on hydrogen-storage systems. Further, the relative economics of each wind-energy system are heavily dependent on wind availability, number of days of energy storage required, and the match between the wind energy available and the energy requirement of the load. Of all the energy requirements characterized, the cash grain operation is shown to be the least adaptable to wind-energy systems.

PB-259 512/2 PC A07/MF A01
Iowa State Univ., Ames.

Estimating Staffing and Cost Factors for Small Wastewater Treatment Plants Less Than 1 MGD. Part I. Staffing Guidelines for Conventional Municipal Wastewater Treatment Plants Less Than 1 MGD
E. Robert Baumann, Keith L. McRoberts, and C. E. Smith. Jun 73, 133p
Grant EPA-5P2-WP-195-0452
Also available in set of 2 reports as PB-259 511-SET, PC E99/MF E99.

Keywords: *Sewage treatment, Municipalities, Manpower, Objectives, Specifications, Effectiveness, Personnel development, Cost analysis, Job analysis.

This study is one of many which has as its primary objective improved wastewater treatment. In the area of water pollution control, proper wastewater treatment is one such control measure. One mechanism for good control is to insure that new and existing treatment plants are operated by adequate numbers of well-trained staff. This report describes the objectives, manpower planning, and management for treatment plants.

PB-259 513/0 PC A06/MF A01
Iowa State Univ., Ames.
Estimating Staffing and Cost Factors for Small Wastewater Treatment Plants Less Than 1 MGD. Part Estimating Costs of Package Wastewater Tr ent Plants
George E. Lamp, Jr, E. Robert Baumann, Keith L. McRoberts, and C. E. Smith. Jun 73, 106p
Grant EPA-5P2-WP-195-0452
Also available in set of 2 reports as PB-259 511-SET, PC E99/MF E99.

Keywords: *Sewage treatment, Cost analysis, Municipalities, Industrial plants, Classifications, Operating costs, Cost engineering, Manufacturers, Estimates, Tables(Data), Capitalized costs, Regression analysis.

Effective and efficient wastewater treatment is a function of both the quality of treatment and the cost of treatment. Although the actual quality and cost of treatment cannot be known until after a plant is in operation, estimates of both are needed at various times during the process of planning and designing a wastewater treatment system. The report describes costs, cost factors, data from manufacturers, and operating package plants.

PB-259 554-T PC A05/MF A01
Agricultural Research Service, Washington, DC.
Biology of Peanut Flowering (Biologiya Tsveteniya Arakhisa)
D. P. Umen. 1976, 77p Rept no. TT-74-52016
Trans. from Vsesoyuznyi Nauchno-Issledovatelskii Institut Maslichnykh Kultur. Nauchno-Proizvodstvennyi Sbornik (USSR) n6 1933, by A. K. Dhote. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Peanut plants, Plant genetics, Plant growth, Plant tissues, Seeds, Humidity, Atmospheric temperature, Books, Translations, *USSR, *Peanuts.

The translation provides a botanical description of the peanut plant; the flowering habits, artificial hybridization, seed production, morphology, and growth factors.

PB-259 615/3 PC A06/MF A01
Virginia Univ., Charlottesville. Dept. of Chemical Engineering.
Enzyme Technology and Renewable Resources
John L. Gainer. 1976, 119p NSF/RA-760180
Grant NSF-AER76-10365
Proceedings of a Conference, Held at Charlottesville, Virginia, on May 19-21, 1976.(PC A06/MF A01)

Keywords: Meetings, *Enzymes, Coenzymes, Resources, Nitrogen fixation, Nitrogen fixing bacteria, Microorganisms, Photosynthesis, Photolysis, Biomass, Utilization, Foods, Carbohydrates, Proteins, Enzyme technology, Immobilized enzymes.

The conference was designed to emphasize areas dealing with renewable resources such as nitrogen fixation, biophotolysis, biomass utilization, food systems--proteins, and food systems--carbohydrates. Summaries of the talks, presentations concerning previous workshops, and a list of conference attendees are included.

PB-259 946/2 PC A13/MF A01
Envirex Inc., Milwaukee, Wis. Environmental Sciences Div.
Handbook for Sampling and Sample Preservation of Water and Wastewater
Contract rept. 28 Jun 74-1 Jun 76
J. H. Moser, and K. R. Huibregtse. Sep 76, 278p*
EPA/600/4-76/049
Contract EPA-68-03-2075

Keywords: Water analysis, Sampling, Reviews, *Waste water, Sediments, Samplers, Water pollution, Field tests, Sewage, Industrial waters, Agriculture, Physical properties, Flow measurement, Statistical analysis, Surface water runoff, Sources, Chemical properties, Biological automation, Measuring instruments, Sites, Design criteria, Preserving, Handling, Parameters, Sludges, Metals, Microbiology, Pesticides, Herbicides, *Water quality, Procedures, Water pollution sampling.

This research program was initiated with the overall objective of providing guidelines for sampling and sample preservation of waters and wastewaters. Information obtained from a review of the literature and the results of a survey of field practices provides the basis for guidelines in general sampling techniques, automatic samplers, flow measuring devices, a statistical approach to sampling, preservation of physical, chemical, biological and radiological parameters, and sampling procedures for waters emanating from municipal, industrial, and agriculture sources. Sampling procedures for surface waters and sludges are also included. This report is not an official EPA manual. Rather, it is a research report which is but one of a series being used as an input to develop EPA Manuals and Guidelines. This report was submitted in fulfillment of Contract No. 68-03-2075 by Envirex, Inc., A Rexnord Company, under the sponsorship of the U.S. Environmental Protection Agency. The report covers the period of June 28, 1974 to June 1, 1976.

PB-259 956/1 PC A06/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Clean Fuels from Agricultural and Forestry Wastes
Final rept. Jun 74-Mar 75
J. W. Tatom, A. R. Colcord, J. A. Knight, and L. W. Elston. Apr 76, 118p EPA/600/2-76/090
Contract EPA-68-02-1485

Keywords: *Fuels, *Agricultural wastes, *Wood wastes, Reclamation, Solid waste disposal, Chars, Manufactured gas, *Pyrolysis, Oxidation, Economic analysis, Design, Air pollution abatement, Mobile equipment, *Waste recycling, Synthetic fuels.

The report gives results of an experimental investigation of the operating parameters for a mobile waste conversion system based on the Georgia Tech Engineering Experiment Station's partial oxidation pyrolysis process. The object of the testing was to determine the combination of parameters producing the most char and oil and the least gas from agricultural and forestry wastes. The test indicated both the dominant influence of air/feed on char and oil yields, and the desirability of low values of this ratio. In addition to the testing, a preliminary design of a 200 ton/day mobile pyrolysis system for conversion of agricultural and forestry wastes into clean fuels was made and a simplified economic analysis conducted. The results of this work indicate the technical feasibility and the economic profitability of such a system.

PB-259 964/5 PC A05/MF A01
Corvallis Environmental Research Lab., College, Alaska. Arctic Environmental Research Station.
Water Related Utilities for Small Communities in Rural Alaska
Interim rept. Jul 73-Jun 76
Bertold Puchtler, Barry Reid, and Conrad Christianson. Sep 76, 84p Rept no. EPA/600/3-76/104

Keywords: *Sewage treatment, *Water supply, Arctic regions, Sanitary engineering, Rural areas, Toilet facilities, Laundries, Sewage disposal, Operating costs, Maintenance, Public utilities, Standards, Alaska, Eskimos, Tertiary treatment.

The 'Alaska Village Demonstration Projects' were authorized by Section 113, P.O. 92-500 (88 STAT 816), for the purpose of demonstrating methods to improve sanitary conditions in native villages of Alaska. Central community facilities have been constructed in the native villages of Emmonak and Wainwright to provide a safe water supply; toilets, bathing and laundry facilities; and sewage and waste disposal. The idea of coming to a community center to secure water, to do the laundry, and to bathe has proven acceptable to the people of Wainwright and Emmonak. However, Alaskan native villages generally can not pay, through service charges, the full cost of routine operation and maintenance of water-related utilities, especially where complex treatment is required to meet waste treatment standards. The physical-chemical wastewater treatment provided required considerable modification and detailed operator attention to provide consistent secondary treatment.

PB-259 973/6 PC A14/MF A01
Environmental Protection Agency, Cincinnati, Ohio. Office of Technology Transfer.
Manual of Methods for Chemical Analysis of Water and Wastes
Jul 76, 317p* Rept no. EPA/625/6-76/003a
See also report PB-211 968.

Keywords: Manuals, Water analysis, Chemical analysis, Surface waters, *Waste water, Industrial wastes, Water pollution, Arsenic, Boron, Bromides, Chlorides, Colors, Organic compounds, Inorganic compounds, Monitoring, pH, Cyanides, Dissolved gases, Fluorides, Iodides, Metals, Trace elements, Oils, Nitrogen, Phosphorus, *Water quality, Water pollution detection, Procedures, Biochemical oxygen demand, Chemical oxygen demand.

This second edition of this manual contains the chemical analytical procedures used in U.S. Environmental Protection Agency laboratories for the examination of ground and surface waters, domestic and industrial waste effluents, and treatment process samples. The manual provides test procedures for the measurement of physical, inorganic and selected organic constituents and parameters.

PB-259 990/0 PC A04/MF A01
Agricultural Research Council, Khartoum (Sudan).
Report of a Workshop on Aquatic Weed Management: Some Prospects for the Sudan and the Nile Basin, Held at Khartoum, Sudan on 24-29 November 1975
1975, 65p
Contract AID/csd-2584

Keywords: *Aquatic weeds, *Weed control, Meetings, Developing countries, Management, Rivers, Lakes, Canals, Recommendations, Utilization, Nile River Basin, Africa, *Aquatic plant control, *Water hyacinth, *Sudan.

This is a report of a workshop on the management and utilization of aquatic weeds in the Sudan and the Nile Basin. The workshop, held November 24-29, 1975, formulated recommendations addressed to one of the most critical environmental problems of the region--the weeds that infest the rivers, swamps, lakes and canals. The report addresses both the water hyacinth problem and the problems of canal weeds, most of which are submerged and not readily seen, but which can render canals useless by blocking the water flow. It is written for administrators and scientists in all the countries of the greater Nile watershed and basin, but focuses particularly on the Sudan as a model case for the region.

PB-259 992/6 PC A09/MF A01
Wisconsin Univ.-Oshkosh.
Wastewater Treatment by Natural and Artificial Marshes
Final rept. Jun 72-Jun 76
Frederic L. Spangler, William E. Sloey, and C. W. Fetter, Jr. Sep 76, 184p EPA/600/2-76/207
Grant EPA-R-803794, EPA-S-801042

Keywords: *Marshes, *Sewage treatment, Primary biological productivity, Water pollution control, Pilot plants, Municipalities, Phosphorus, Vegetation, Nutrients, Water quality, Removal, Aquatic plants, Harvesting, Effectiveness, Tables(Data), *Waste water, Ecosystems, Artificial marshes, Scirpus validus.

Investigations were conducted on the use of artificial and natural marshes as purifiers of effluent from municipal treatment plants. Observations were made on marsh influent and effluent quality. Phosphorus distribution in the ecosystem and removal by harvesting were studied. Responses of the vegetation to repeated harvesting were recorded. Artificial marshes consisted of plastic-lined excavations containing emergent vegetation, especially Scirpus validus, growing in gravel. Various combinations of retention time, primary effluent, secondary effluent, basin shape, and depth of planting medium were studied. A polluted natural marsh was studied simultaneously. The degree of improvement in water quality suggests that the process may be acceptable for certain treatment applications.

PB-260 051/8 PC A03/MF A01
Massachusetts Inst. of Tech., Cambridge
Contributions from the Sanitary Research Laboratory and Sewage Experiment Station. Volume X. Studies on the Digestion of a Sewage-Filter Effluent by a Small and Otherwise Unpolluted Stream
Report dated 1 Jul 14-1 Jul 16
Robert Spurr Weston, and C. E. Turner. 1917, 50p
Sponsored in part by Public Health Service, Washington, DC. Portions of this document are not fully legible.

Keywords: Sewage flow rate, *Sewage treatment, Sewage bacteria, Sewage disposal, Water pollution, Stream flow, Stream pollution, Waste disposal.

Results are presented of a 2-year study to determine to what extent a stream, lake, or estuary will receive and digest the effluents from sewage purification plants. Emphasis is on the biological aspects. Data indicates that slowly moving water is able to digest and highly purify effluents in large volume with the first three-fourths of a mile. The process of digestion is almost wholly biological and is extremely sensitive to conditions such as temperature, rainfall, and the amount and character of plant and animal life.

PB-260 346/2 PC A11/MF A01
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Div. of Water Supply and Pollution Control
Water Quality Management - Training Course Manual
Mar 65, 236p

Keywords: Water quality management, Manuals, Personnel development, Sanitary engineering, *Water pollution, *Water quality, *Training, Pollution control.

The training course manual, including outlines of presentations, prepared for those attending a 2-week course designed for sanitary engineers and others with responsibilities in the administration of water quality management programs and conducted by Water Supply and Pollution Control Training, Training Program, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.

PB-260 469/2 PC A02
Louisiana State Univ., Baton Rouge. School of Forestry and Wildlife Management.
Two Major Problems in Culturing Crayfish in Ponds: Oxygen Depletion and Overcrowding
James W. Avault, Jr, Larry W. de la Bretonne, and Jay Huner. 1974, 9p LSU-R-74-022, NOAA-76082609
Pub. in Proceedings of the International Crayfish Symposium (2nd), Baton Rouge, La. 1974 p139-144 1974.

Keywords: Crayfishes, Aquaculture, *Ponds, Oxygen, Dissolved gases, Water quality, Harvesting, Recommendations, *Fishes, Sea Grant program, Reprints.

The two major problems in culturing crayfish in ponds are low dissolved oxygen and overcrowding. This paper discusses general field observations of pond failures and suggests solutions. Poor water quality is attributed to one or more of the following: Source water of poor quality; pond heavily grown over with terrestrial vegetation at time of flooding; other farm crops occupy the time of the crayfish farmer and poor water circulation in ponds. Two major reasons for overcrowding are that not enough food is available and there is inadequate harvest. Inadequate harvesting results from: not enough traps used; not harvesting daily; high cost of bait; an abundant supply of wild crayfish; and other farm duties.

PB-260 606/9 PC A14/MF A01
National Academy of Sciences, Washington, DC.
Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries
1976, 306p*
Contract AID/csd-2584

Keywords: Developing countries, Rural areas, Regional planning, Energy sources, Solar energy conversion, Wind power, Windpower utilization, *Hydroelectric power, Photosynthesis, *Geothermal energy, Energy storage, Reviews, Reviewing, *Energy source development, *Solar energy, *Wind energy, *Bioconversion, Biological energy conversion.

This report provides a summary of the state of the art of alternative technologies frequently suggested as solutions to rural or individual-family energy needs. Moreover, it informs both the technologist and the planner where to go for more detailed information and what kinds of research and development are needed before a particular device or process is ready for use.

PB-260 633/3 PC A04/MF A01
Illinois Dept. of Business and Economic Development, Springfield. Div. of Energy.
Energy Recovery from Solid Waste: A Review of Current Technology
Final rept.
Dugald O. Black. Jul 76, 68p* NSF/IDOE-76-05

Keywords: Energy sources, Solid waste disposal, Reclamation, Refuse disposal *Pyrolysis, Incinerators, Biodeterioration, Design, Technology, Cost analysis, Reviews, *Waste recycling, *Bioconversion, Incineration.

This report was written to aid a community in selecting an energy recovery solid waste disposal system that best fits their needs. The choice of an appropriate conversion process for energy recovery is highly sensitive to each local situation. A critical factor to be considered in the selection of any conversion process is the economic aspect of each system. A discussion of the economic factors and the relative advantages and disadvantages of each process is included.

PB-260 763/8 PC A08/MF A01
Stanford Research Inst., Menlo Park, CA.
An Evaluation of the Use of Agricultural Residues as an Energy Feedstock. Volume I
J. A. Alich, Jr, R. E. Inman, and K. Ernest. Jul 76, 164p* NSF/RANN/SE/GI-18615/FR/76/3, NSF/RA-760286
Grant NSF-AER74-18615-A03
See also Volume 2, PB-260 764. Continuation of Grant NSF-GI-18615.

Keywords: *Agricultural wastes, Energy sources, Waste utilization, Organic wastes, Farm crops, Fertilizers, Wastes, Forest trees, Trees(Plants), Bark, Wood, Plant residues(Organic), Waste management, Materials recovery, Electric power generation, Manufactured gas, Low btu gas, High btu gas, *Methane, Anaerobic processes, Cost analysis, Cost estimates, Inventories, *Bioconversion, *Waste recycling, Manure, Energy resources, Feedstocks.

Since agricultural residues (crop and forest wastes and animal manures) constitute a potential supplemental source of energy, the authors examine the availability of such residues and evaluate their potential use as an energy feedstock. The report is presented in two volumes: the method of approach used in inventory development, the collection, harvesting, and conversion economics, and the overall concept assessment are presented in Volume I.

PB-260 770/3 PC A04/MF A01
Soil Conservation Service, Washington, D.C. Engineering Div.
Earth Dams and Reservoirs
Final rept.
Jun 76, 59p Rept no. SCS/ENG/TR-60

Keywords: Earth dams, *Reservoirs, Design, Reservoir engineering, Embankments, Foundations, Spillways, Hydrology, Geological surveys, *Dams.

The Technical Release(TR) was developed to describe design procedures and present minimum requirements for planning and designing earth dams and associated spillways. The material is applicable to dams and reservoirs larger than ordinary farm ponds. The TR is intended for use of SCS engineers but the contents will be useful to engineers in other organizations. Hydrology requirements and data are presented for various type structures and for each of the three hazard classes. Geologic investigation requirements are covered including seismic assessments. Earth embankment and foundations are described including minimum factors of safety for embankment slope stability. Spillways are covered including hydraulic design, structural strength and stability of earth and vegetated spillways.

PB-261 002/0 PC A02/MF A01
Washington State Univ., Pullman.
Apply Pesticides Correctly. A Guide for Commercial Applicators. Right-Of-Way Pest Control
Dean G. Swan. 1976, 17p EPA/540/8-76/029
Contract EPA-68-01-2263
Prepared in cooperation with North Carolina State Univ., Raleigh, Washington State Highway Commission, Olympia, and Minnesota Dept. of Highways, St. Paul. See also PB-257 723.

Keywords: Herbicides, Weed control, Highways, Manuals, Plant growth, Plant regulators, Standards, Grasses, Shrubs, Vegetation, States(United States), Windward drift, Right of way acquisition. *Pesticides.

This guide contains basic information to help meet specific standards for applicators who are engaged in right-of-way weed control. Because the guide was prepared to cover the entire nation, some information important to specific states might not be included.

PB-261 091/3 PC A02/MF A01
Environmental Protection Agency, Washington, DC. Office of Solid Waste Management Programs.
Anaerobic Digestion of Solid Waste and Sewage Sludge to Methane
Steven J. Hitte. Jul 75 17p Rept no. EPA/530/SW-159

Keywords: Solid waste disposal, Sludge disposal, Anaerobic processes, *Methane, Synthetic fuels, Manufactured gas, Sewage disposal, Refuse disposal, Organic wastes, Waste processing, Reclamation, Economic analysis, Feasibility, *Bioconversion, *Waste recycling, Sewage sludge, Refused derived fuels.

The primary objective of this report is to evaluate the potential for processing organic wastes (solid waste and sewage sludge) using a controlled anaerobic digestion process for the purpose of producing methane.

PB-261 268/7 PC A02/MF A01
Skokomish Tribal Council, Shelton, Wash.
Fish Processing Plant Management Assistance for Skokomish Tribal Council, Mason County, Washington
Nov 76, 12p EDA-76-073
Grant EDA-07-6-01480

Keywords: *Food processing, *Fishes, Economic development, American Indians, Industrial plants, Marketing, Inventories, Accounting, Employment, Production planning, Revenue, Sales, Indirect costs, Training, Personnel, Salmon, Environmental impacts, Industrial waste treatment, Tables(Data), Washington(State), Mason County(Washington).

This study seeks to provide assistance and training of tribal members in the management, processing, and marketing of salmon and seafood in the new tribally owned processing plant. Along with the training of personnel to operate the plant, the plant seeks to establish accounting, inventory and production systems. The benefits of the plant would be three fold. First, the plant would insure that fishermen would receive a fair price for their catch. Second, employment for tribal members on the reservation would be created and third, the seafood processing plant would have the potential of earning sufficient revenues to be used for the development of additional business and jobs.

PB-261 818/9 PC A08/MF A01
Asian Inst. of Tech., Bangkok (Thailand).

Ferrocement, A Versatile Construction Material: Its Increasing Use in Asia
Ricardo P. Pama, Seng-Lip Lee, and Noel D. Vietmeyer. 1976, 114p*
Proceedings of Workshop on Introduction of Technologies in Asia-Ferrocement, a case study. Held at Bangkok (Thailand) on November 5-6, 1974. Sponsored in Part by Agency for International Development, Washington, DC. Office of Science and Technology, and National Academy of Sciences, Washington, DC.

Keywords: *Reinforced concrete, Meetings, Thailand, Construction materials, Concrete construction, Shipbuilding, Technology transfer, Residential buildings, Bins, Water tanks, *Concrete, *Southeast Asia, *Ferrocement.

The workshop brought together engineers, scientists, administrators, and businessmen and gave them the opportunity to exchange views on, and experience with, ferrocement. The workshop's basic purposes were: (1) to survey both the state of the art of ferrocement technology and its applications important to Southeast Asia; (2) to provide information on ferrocement research and development taking place in Asia and to share the knowledge and experience gained thus far; (3) to discuss the most promising methods of introducing ferrocement technology to Asia from the point of view of effectiveness, cost, and social acceptability; (4) to recommend areas of technical and social research that need to be carried further with respect to ferrocement. Demonstrations of ferrocement construction were held during the workshop. Fifty five participants from 17 nations attended. Immediately following the workshop, a demonstration for the benefit of some 50 village heads from several districts in Pathumtani province was held.

PB-261 939/3 PC A12/MF A01
Woods Hole Oceanographic Institution, MA.
Marine Polyculture Based on Natural Food Chains and Recycled Wastes
Technical rept.
John H. Ryther. Oct 76, 275p WHOI-76-92, NOAA-76111019
Contract E(11-1)-2948, Grant NOAA-04-6-158-44016

Keywords: *Aquaculture, *Algae, *Sewage treatment, Food chains, Nitrogen cycle, Waste water reuse, Sea water, Circulation, Oysters, Clams, Mussels, Shellfish, Growth, Mollusca, Nutrients, Crustacea, Invertebrates, Fishes, Sea grasses, Lobsters, Tables(Data), *Waste recycling, Sewage effluents, Waste water, Secondary sewage treatment.

Research has continued during the past Sea Grant fiscal year on the development, testing, and evaluation of a combined waste recycling-marine polyculture system. The concept of the system is to grow unicellular marine algae (Phytoplankton) in mixtures of seawater and the effluent from a secondary sewage treatment plant. The algae grown in continuous flow-through cultures, are then fed to bivalve molluscs, such as oysters, clams, scallops, or mussels. The algae remove the nutrients from the wastewater and the molluscs remove the algae. Finfish (winter flounder) and crustacea (American Lobster) are stocked as post-larval or juvenile animals together with the molluscs to feed upon the solid wastes (feces and pseudo feces) produced by the shellfish and upon the small invertebrate fauna (polychaete worms, amphipods, etc.) that are supported by these wastes. Seaweeds constitute a final polishing stage to the system, receiving the effluent from the animal culture system and removing from it nutrients regenerated through excretion and metabolism of the animals as well as any nutrients from the wastewater not initially removed by the phytoplankton. Twelve reports by various authors are compiled in this volume.

PB-262 039/1 PC A04/MF A01
Woods Hole Oceanographic Institution, MA.
Marine Technology Transfer as Foreign Aid to Less Developed Nations from Oceanographic Institutions in Industrialized Countries: A Search for an Effective Mechanism in the Educational Sector
Technical rept.
M. Lamin Sarr. Sep 76, 59p WHOI-76-84, NOAA-76111031
Grant NOAA-04-6-158-44016

Keywords: *Marine engineering, Technology transfer, Developing countries, Systems analysis, Organizations, Performance evaluation, Oceanography, Training devices, Organizations, Problem solving, Personnel development, Scientists, Foreign aid, *Education, *Training, Deficiencies, Industrialized countries.

This study examines systems of transferring marine technology through education and training and suggests solutions to the problems that have been the cause of failure in the process. In so doing, the nature of the educational institutions, both in the industrialized nations and in those developing nations where they exist have been reviewed. Inadequacies have been identified at both levels; inadequacies that stem not only from the educational systems but also concerning government involvement as well as social attitudes. This problem identification is followed by suggested solutions for each case and in some instances such suggestions are supported and substantiated with descriptions of cases where success or at least potential for success have been achieved.

PB-262 134/0 PC A05/MF A01
Department of Health, Education and Welfare, Washington, DC. Office of Consumer Affairs.
Buying Solar
Joe Dawson. Jun 76, 81p* FEA/G-76/154

Keywords: Solar space heating, Solar air conditioning, Manuals, *Solar heating systems, Insulation, Benefit cost analysis, Return on investment, Surveys, *Solar cooling systems, *Solar water heating, Degree days.

This book offers guidelines for the consumer interested in buying solar systems. It should help the homeowner considering the use of solar energy for space heating and cooling and domestic water heating to make informed decisions based on geographic location, type of home, quality of insulation, present energy costs, and type of solar system intended for purchase. It includes engineering terms used to evaluate or describe solar products.

PB-262 338/7 PC A05/MF A01
National Center for Appropriate Technology, Butte, Mont.
A National Program to Develop and Implement Technologies Appropriate for Low-Income Communities
7 Sep 76, 93p OEO-LN-1710

Keywords: *Community development, Technology innovation, Low income groups, *Energy, Conservation, *Socioeconomic status, Information centers, Weatherproofing, Hydroponics, Solar heating, Wastes, Project planning.

The proposal for a National Center for Appropriate Technology suggests a program of research and development, with a specific mission in its first year of developing, modifying, adapting, and implementing technologies which can be helpful to poor people. Particularly it deals with the problems of rapidly increasing energy cost, and with a specific focus on technological support to the CSA Weatherization Program.

PB-262 488/0 PC A15/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Guide for Field Crops in the Tropics and the Subtropics
Program and training journal reprint series
Samuel C. Litzenberger. Sep 76, 332p Rept no. Reprint Ser-10
Prepared by Agency for International Development, Washington, D.C. Crops Production Div.

Keywords: Farm crops, Agronomy, Tropical regions, Grain crops, Grains(Food), Leguminous plants, Oilseed crops, *Fruits, *Vegetables, Fiber crops, Tobacco plants, Manuals, *Crops, *Plants (Botany).

Contents:
- The tropical environment for crop production;
- Farming systems for the tropics and subtropics;
- General principles of improved crop production in the tropics and subtropics;
- Cereal crops;
- Food grain legumes;
- Oil seed crops;
- Starchy crops;
- Fiber crops;
- Special crops.

PB-262 489/8 PC A09/MF A01
Katzen (Raphael) Associates, Cincinnati, Ohio.
Chemicals from Wood Waste
Final rept.
Allan E. Hokanson, Vincent B. Diebold, Douglas W. Bennett, Russell P. Klier, and Stephen A. Stein. 24 Dec 75, 196p Rept no. AN-441
Sponsored in part by Forest Products Lab., Madison, Wis.

Keywords: Organic compounds, *Wood wastes, Economic analysis, Cost estimates, Carbinols, Methyl alcohol, *Ethanol, *Phenols, Furfurals, Formaldehyde, Operating costs, Capitalizing costs, Industrial plants, Process charting, Design criteria, Paper industry, Production, *Methanol.

A study of the economics of producing chemicals from wood waste was carried out for the Forest Products Laboratory. Results included: (1) outlining chemical processes based on known technology for producing methanol, ethanol formaldehyde, furfural, and phenols from wood waste; (2) estimating investment and operating costs for these plants; and (3) comparing the economics with those for producing the same chemicals from more conventional raw materials.

PB-262 511/9 PC A05/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Visual Aids - A Guide for Peace Corps Volunteers
Program and training journal reprint series.
Mar 76, 82p Rept no. Reprint Ser-2

Keywords: Visual aids, Public health, Developing countries, Handbooks, Instructional materials Social welfare, Personnel development, Technology, Selection, Methodology, Reference groups, Preparation, Fabrication, Motivation, International relations, Symbols, *Health, *Management techniques, Latrinos, Volunteers.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on intermediate technology with other participants in the international development community. Successful intermediate technologies designed for use in developing countries utilize low cost, locally available resources and provide new methods and approaches that are relevant to the needs of the users. While supplementing, testing, and modifying the materials made and used volunteers will continue to develop new techniques and strategies. The questions, developments and adaptations will provide a framework for future manuals.

PB-262 606/7 PC A04/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Health Education: A Study Unit on Fecal-Borne Diseases and Parasites
Program and training journal reprint series
Merry Lee Corwin. Mar 76, 60p Rept no. Reprint Ser-1
Prepared by Peace Corps/Philippines.

Keywords: *Health education, Parasitic diseases, Manuals, Public health, Feces, Infectious diseases, Parasites, Life cycles, Disease vectors, Preventive medicine, Philippines, Developing countries, *Diseases.

The purpose of this unit is to help the student reach a real understanding of how a person's habits determine his health. Through a step-by-step learning procedure, this unit is designed to present the knowledge necessary to gain this understanding in a logical progression. The child should be educated about these diseases so that in the end he will understand (1) that these diseases are important to know about; (2) that a certain few things are spreading them; (3) that these diseases can be prevented; (4) that each person is responsible for the state of his own health. All these diseases are prevalent in the Philippines, and they are here mainly because most people simply do not know about them and how they are spread and how serious they are. It has been found that if this unit is well taught in the school, it can generate effects which will result in the improvement of health and sanitation practices in the community.

PB-262 630/7 PC A03/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Peace Corps Intermediate Technology for 15 Years
Program and training journal reprint series.
May 76, 32p Rept no. Reprint Ser-A

Keywords: Mechanical engineering, Developing countries, Technology innovation, Manuals, Experimental design, Performance evaluation, Equipment, Creativity, Centrifuges, Dusting, Bellows, Pest control, Braille, Blocks, Grain, Storage, Drying apparatus, Silos, Construction, Earthquake resistant structures, Tiles, Roofs, *Food storage, *Housing, *Agriculture, Contrived equipment, Volunteers, Letter blocks, Crop dusters, Grain storage.

The effort to devise and implement intermediate technologies has been a hallmark of Peace Corps activity since the organization's inception in 1961. A major effort is currently underway to take Volunteer-developed technologies beyond the areas where they were first devised and to make them available to the wide range of development workers who may need them. Manuals are issued that review Peace Corps-generated materials.

PB-262 631/5 PC A06/MF A01
ACTION/Peace Corps, Washington, D.C. Information Collection and Exchange.
Agricultural Mathematics for Peace Corps Volunteers
Program and training journal reprint series.
Mar 76, 103p Rept no. Reprint Ser-4
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-73-1034.

Keywords: *Agriculture, Mathematical analysis, Handbooks, Measurement, Water flow, Irrigation, Construction, Construction materials, Foundations, Concrete, Agricultural machinery, Units of measurement, Runoff, Yield, Farm crops.

This manual is designed to convey insights into various agricultural practices and techniques. Primary emphasis is given to providing answers and procedures for the solution of specific agricultural mathematic problems. These areas include: Water and irrigation, construction, land leveling and crop production, agricultural machinery, and general agricultural information.

PB-262 668/7 PC A03/MF A01
Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.
Evaluation of the Health Aspects of Sucrose as a Food Ingredient
Final rept.
1976, 34p* SCOGS-69, FDA/BF-77/37
Contract FDA-223-75-2004
Report of Select Committee on GRAS Substances.

Keywords: Sucrose, Toxicology, Food additives, Food consumption, *Sugar, Consumers, Opinions, *Food fortification, *Health, Disaccharides, Tables(Data), Absorption(Biology), Diabetes melitus, Metabolism, Rats, Laboratory animals, Bioassay, Experimental data, Toxicity, Dental caries, Arteriosclerosis, Dosage, GRAS food ingredients, Generally recognized as safe food ingredients.

The report by a group of qualified scientists, designated the Select Committee on GRAS Substances (SCOGS), provides an independent evaluation on the safety of sucrose in food at its present or projected levels of use.

PB-262 735/4 PC A07/MF A01
Texas Univ. at Austin. Center for the Study of Human Resources.
An Analysis of Selected Start-Up Industry Training Programs as Vehicles for Human Resources Development
Final rept. Aug 73-1976
Roy R. Van Cleve. Dec 76, 135p DLMA-21-48-74-01-1
Grant DL-21-48-74-01
Extracts Presented - Task Force on Southern Rural Development, August, 1975. ASSA December 1975, Dallas.

Keywords: Industrial training, Technology innovation, Economic development, Low income groups, Manpower utilization, Upgrading, Salaries, Personnel development, Hypotheses, Regression analysis, Projects, Evaluation, Unemployment, South Carolina, North Carolina, Virginia, Alabama, Counties, Socioeconomic status, Regional planning, Specialized training, Economic surveys, *Training, Underemployment.

The 'start-up' industry training concept has received considerable attention as a way to better match workers and jobs, to 'leapfrog' the industrial development process by attracting higher-wage industry to an area through upgrading local work forces, and to make it possible to increase the wages of low-income workers. This study examines in detail the programs of South Carolina, North Carolina, Virginia and Alabama and their effect on industrial relocation trends and the leapfrogging of the unemployed and underemployed into the labor force.

PB-262 745/3 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
A Glossary of Agricultural Terms: English-Spanish, Spanish-English
Program and training journal reprint series.
Mar 76, 103p Rept no. Reprint Ser-9
Prepared by American Univ., Washington, D.C. American Language Center. Sponsored in part by International Cooperation Administration, Washington, D.C.

Keywords: *Agriculture, Dictionaries, Spanish language, English language, Instructional materials.

This bilingual glossary is a modest attempt to fill one of the needs of Spanish-speaking agriculturists receiving training under the program of the International Cooperation Administration. The list is not complete in any sense. It is based largely on suggestions made by experts engaged in the training of foreign agricultural specialists both abroad and in the United States.

PB-262 746/1 PC A08/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Crop Production Handbook for Peace Corps Volunteers
Program and training journal reprint series.
Mar 76, 153p Rept no. Reprint Ser-6
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-73-1034.

Keywords: *Agriculture, Farm crops, Manuals, Production, Climate, Soil properties, Soil classification, Soil fertility, Fertilizers, Weed control, Plant growth, Insect control, Entomology, Grain crops, Plant diseases, Leguminous plants, Sugar beets, Fiber crops, Oilseed crops, *Crops, *Soils.

This manual is designed to convey insights into basic crop production principles and practices. Primary emphasis is given to providing explanation and illustration of soil, plant, and water relationships as they affect crop production. Care has been taken to make the content realistic and meaningful and to present it with as non-technical a vocabulary as is possible.

PB-262 747/9 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Irrigation - Principles and Practices for Peace Corps Volunteers
Program and training journal reprint series.
Mar 76, 116p Rept no. Reprint Ser-5
Prepared by Development and Resources Corp., Washington, D.C., Contract PC-25-1703.

Keywords: *Irrigation, Agriculture, Manuals, Control equipment, Subsurface irrigation, Surface irrigation, Sprinkler irrigation, Soil properties, Soil water, Pipelines, Pumps, Drainage, Runoff, Salinity, Ditches, Weirs, Soil texture, Tables(Data).

Contents:
- Irrigation principles;
- Water measurement;
- Irrigation water control;
- Drainage;
- Irrigation planning and special information related to irrigated crop production and relevant problems;
- Explanation for irrigation implements;
- Plans for animal drawn implements useful in field preparation for irrigation.

PB-262 748/7 PC A06/MF A01
Washington State Dept. of Fisheries, Olympia.
Library Search of Japanese Fishery Research Publications
Completion rept. 1 Apr-31 May 76
Ronald E. Westley. Sep 76, 112p NOAA-76112401

Keywords: Shellfish, Aquatic animals, Bibliographies, Clams, Shrimps, Mollusca, Squids, Cephalopoda, Aquaculture, Reproduction(Biology), Life cycles, Growth, *Japan, United States, *Fisheries.

The marine animals, abalone, clams, scallops, squid, and shrimp, are all important marine resources; and because of this, they require careful management for optimal utilization. In order to determine the best management strategies, it is necessary to understand the research that has been done both in the U.S. and abroad. This report was prepared to indicate the extent of the literature on each of these animals, and special emphasis has been placed on the literature from Japan. This listing should make it possible to determine whether the preparation of up-to-date review papers would be beneficial. The references are organized by topic; under each topic the references are listed in alphabetical order by author.

PB-262 754/5 PC A14/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Health Training Resource Material for Peace Corps Volunteers
Program and training journal reprint series.
1976, 318p Rept no. Reprint Ser-3

Keywords: Specialized training, Hygiene, Developing countries, *Health education, Nutrition, Sanitation, Children, Food, Clothing, Washing, Insect control, Public health, Instructional materials, *Training, Peace Corps volunteers.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on 'intermediate technology' with other participants in the international development community. Successful intermediate technologies designed for use in developing countries utilize low cost, locally available resources and provide new methods and approaches that are relevant to the needs of the users. Each Reprint, concentrating on a specific topic, is intended to contribute to PCVs' ability to respond creatively to challenges in the field.

PB-262 768/5 PC A04/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
An Expanded Collection of Language Informant Techniques
Program and training journal reprint series
Gary Engelberg. Jun 76, 58p Rept no. Reprint Ser-12
Prepared by ACTION/Peace Corps, Dakar (Senegal). Regional Training Resource Office.

Keywords: Languages, Learning, Methodology, Specialized training, Developing countries, *Education., Peace Corps volunteers.

Techniques for learning the sounds and structures of a language, especially unwritten, from native speakers of the language, usually pedagogically unskilled and often unlettered, have long been part of modern descriptive linguistics. But the Peace Corps has only recently recognized their value. Their purpose is to allow PCVs to: (1) Continue language learning in the field without trained teachers; (2) avoid the pitfall of talking about language through involved grammatical discourse with local 'scholars'; (3) develop their own materials concentrating on problems peculiar to their dialect area and job when texts, especially drills and exercises, are unavailable; and (4) create varied and interesting learning sessions for both Volunteer and informant.

PB-262 769/3 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Soils, Crops, and Fertilizer Use. A Guide for Peace Corps Volunteers
Program and training journal reprint series
Dave Leonard. Mar 76, 111p Rept no. Reprint Ser-8

Prepared by Peace Corps Training Center, Arecibo, Puerto Rico.

Keywords: Agriculture, Soils fertility, Farm crops, Soil profiles, *Fertilizers, Recommendations, Soil tests, Acidity, pH, Calcium oxides, Manuals, *Crops, *Soils.

Contents:
- Some facts about soils;
- Understanding soil fertility;
- Organic fertilizers;
- Chemical fertilizers;
- How to determine fertilizer needs;
- Using fertilizers;
- Getting the most out of fertilizers;
- Liming soils.

PB-262 851/9 PC A05/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
L'Utilisation du Silo Fosse et des Lecons Techniques. (The Use of Pit Silos, and Technical Lessons.)
Program and training journal reprint series
Leslie A. Temanson. Jun 76, 76p Rept no. Reprint Ser-15
Text in French. Adapted from a brochure, 'Les Silos Fosses dans le Savane Africaine' by James E. Diamond, 1971.

Keywords: Silos, Underground storage, Developing countries, Africa, Agriculture, Instructional materials, *Food storage.

The report describes the construction, use, and maintenance of underground silos for agricultural purposes. Also included is an instruction manual related thereto. (Portions of this document are not fully legible.)

PB-262 928/5 PC A17/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Glossary of Environmental Terms: Spanish-English, English-Spanish
Program and training journal reprint series
Richard E. Saunier. Jun 76, 390p Rept no. Reprint Ser-17

Keywords: Dictionaries, Spanish language, English language, Words(Language), Environments, *Environmental management.

This volume, part of the Program and Training Journal Reprint Series, is integral to Peace Corps efforts to provide technical support to its Volunteers and to share its material on 'intermediate technology' with other participants in the international development community. This glossary was not compiled to standarize usage. Rather it was compiled for the use of Peace Corps Volunteers who, because of where, how and why they work, are required daily to communicate in terms that are often neither cultured nor correct.

PB-262 929/3 PC A16/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Combatting Hansen's Disease
Program and training journal reprint series
Daniel T. Pekarske. Jun 76, 371p Rept no. Reprint Ser-16

Keywords: Leprosy, Developing countries, Manuals, Bacterial diseases, Infectious diseases, Mycobacterium leprae, Physiology, Pathophysiology, Immunology, Epidemiology, Pathology, Clinical medicine, Public health, *Health education, Diagnosis, Chemotherapy, Social welfare, Patients, South Korea, Health science centers, Government, Preventive medicine, *Diseases, Hansen's disease, Chronic disease management.

Contents:
- Pertinent physiology and immunology;
- Hansen's Disease--three perspectives;
- Health education;
- Case finding;
- Diagnosis;
- Patient management;
- Cooperating institutions.

PB-262 951/7 PC A04/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Guidelines for Development of a Home Industry
Program and training journal reprint series
Lynn Olcott. Jun 76, 68p Rept no. Reprint Ser-14

Keywords: Handicapped persons, *Rehabilitation, Crafts, Project management, Marketing, Social welfare, Manuals, Ethiopia, *Small businesses, Peace Corps volunteers.

This book attempts to describe the operations of the Volunteer Rehabilitation Project (VRP), a handicraft project for handicapped persons (mostly leprosy patients) in Ethiopia. The goal is to establish a setting in which handicapped persons can, by modifying known skills and learning new skills, earn a living wage; thereby allowing handicapped persons to be economically self-sufficient members of society.

PB-263 089/5 PC A09/MF A01
Hawaii Univ., Honolulu. Water Resources Research Center.
Eutrophication and Fish Toxicity Potentials in a Multiple-Use Subtropical Reservoir
Technical rept.
Reginald H. F. Young, Gordonn L. Dugan, L. Stephen Lau, and Hiroshi Yamauchi. Jul 75, 191p TR-89, W77-03825

Keywords: *Water pollution, Reservoirs, *Sewage treatment, Aquatic biology, Algae, Growth, Fishos, Toxicity, Phosphorus, Nitrogen, Bioassay, Concentration(Composition), Tables(Data), Sediments, Chlorine, Tolerances(Physiology), Nutrients, Oxygen, Dissolved gases, Oahu Island, Hawaii, Eutrophication, Wahiawa Reservoir, *Water quality.

The impact of secondary-treated effluents from the Wahiawa and Whitmore Sewage Treatment Plants on the Wahiawa Reservoir, Oahu, was investigated in terms of water and sediment quality, algal growth potential, and fish toxicity. Reservoir and waste water management alternatives were investigated based on those environmental inputs and preliminary estimates of costs and benefits of the alternatives. Nitrogen and phosphorus resulting from the discharges were determined to be responsible for seasonal stresses on both the water quality and fishes. The two most feasible alternatives for improving the situation were reuse of secondary effluent for sugarcane irrigation and seasonal tertiary waste water treatment with the latter being the more favored of the two.

PB-263 155/4 PC A22/MF A01
Office of Water Research and Technology, Washington, DC. Water Resources Scientific Information Center.
Irrigation Efficiency. A Bibliography. Volume 2
Rept. for Mar 73-Sep 76.
Dec 76, 512p* Rept nos. OWRT/WRSIC-76/206, W77-03968
See also PB-220 349.

Keywords: *Irrigation, Bibliographies, Efficiency, Farm crops, Water supply, Sprinkler irrigation, Subsurface irrigation, Surface irrigation, Patents, Water conservation, Soil moisture, Deserts, *Arid land, Salinity, Agronomy, Ground water, Pumping, *Water use, Drip irrigation, Trickle irrigation.

This report, containing 346 abstracts, is another in a series of planned bibliographies in water resources produced from the information base comprising SELECTED WATER RESOURCES ABSTRACTS (SWRA). Volume 2 covers the period from March 1973 through September 1976 (Volume 9, Number 18). Author and subject indexes are included.

PB-263 175-T PC A08/MF A01
Agricultural Research Service, Washington, DC.
Pollination of Entomophilous Agricultural Crops by Bees
1976. 159p Rept no. TT-74-52010
Trans. of mono. Opylenie Pchelami Entomofilnykh Solskokhozyaistvennykh Kultur, Moscow, 1972, by V. S. Kothekar. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Farm crops, Pollen, *Bees, Arthropoda, Seeds, Apple trees, Leguminous plants, Toxicology, Books, Production, Economic factors, Oilseed crops, Forest land, Citrus trees, Food, Greenhouses, Polar regions, Yield, Translations, *USSR, *Crops, Entomophilous plants, *Pollination, Buckwheat plants.

A large number of scientific experiments and considerable progressive farming have demonstrated that pollination of flowers by bees is an effective and cheap biological means to improve the yields of entomophilous crops. The present book contains the results of the latest studies on the use of honeybees for increasing the yields of entomophilous crops and honey production through planned bee pollination. This volume of collected articles is of interest to workers in the fields of apiculture and plant cultivation, specialists, research workers, and amateur beekeepers.

PB-263 349/3 PC A07/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Manual Didactico: Huertos Escolares y Nutricion (Teaching Manual: School Gardens and Nutrition).
Program and training journal reprint series.
Sep 76, 144p Rept no. Reprint Ser-18
Text in Spanish. Prepared by Peace Corps/Guatemala. Originally published by Ministerio de Educacion, Guatemala City. Programa de Nutricion y Huertos Escolares para el Area Rural.

Keywords: *Health education, Nutrition, Horticulture, Hygiene, Public health, Manuals, Developing countries, *Vegetables, *Guatemala, Rural areas, Instructional materials, *Fruits, Peace Corps volunteers, Gardens.

The report is a teachers manual covering school gardens, nutrition, and personal hygiene. It was originally intended for use by Peace Corps Volunteers working in rural primary schools in Guatemala.

PB-263 399/8 PC A19/MF A01
Texas A and M Univ., College Station. Dept. of Marine Resources Information.
Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference (First) Held in Corpus Christi, Texas on March 8-10, 1976. Volume I
Bryant F. III Cobb, and Alexandra B. Stockton. Oct 76, 432p TAMU-SG-77-104, NOAA-76122901
Grant NOAA-04-6-158 44012

Keywords: *Fisheries, Tropical regions, Meetings, Shellfish, Crustacea, Aquaculture, Marine biology, Biochemistry, Contamination, Biphenyl, Fresh water fishes, Marine fishes, Seafood, Hydrocarbons, Animal diseases, Shrimps, Reproduction(Biology), Animal physiology, Market research, Lobsters, Sea Grant program, Biphenyl/chloro.

Volume I of the Proceedings of the First Annual Tropical and Subtropical Fisheries Technological Conference contains the following papers: The value of technology to the seafood industry; The FAO programme of cooperative research in tropical fish technology; The spoilage of fish in the tropics; Cellular aspects of reproduction in Penaeid shrimp; Texas A&M University shrimp mariculture program; Current status of the culture of river shrimps of the Genus macrobrachium; Chemical and nutritive composition of shrimp; Biochemistry and physiology of shrimp - effect on use as food; Cholesterol in crustacea; Water migration and dehydration in stored frozen breaded shrimp; International standardization of shrimp products - U.S. contribution; Bacteriology of shrimp; Time and temperature parameters for the destruction of Salmonella in cooked, peeled and deveined shrimp; Trace elements found in various species of shrimp harvested from selected areas; Polychlorinated biphenyls in shrimp; Analysis of petroleum hydrocarbon contamination in shrimp; Sodium bisulfite and its residual use in controlling blackspot in shrimp; Utilization of recovered shrimp protein as a pigment source for salmonids; and the status of the shrimping industry.

PB-263 408/7 PC A03/MF A01
Cornell Univ., Ithaca, NY. Center for Environmental Quality Management.
Workshop on Research Methodologies for Studies of Energy, Food, Man and Environment
Final rept. on Phase 2
David Pimentel, Walter R. Lynn, William K. MacReynolds, and Maxine Dattner. 11 Nov 74, 26p NSF/ERG-10
Grant NSF-DEB74-21350
See also PB-263 407 and PB-236 143.

Keywords: *Food supply, *Energy, Farm crops, Meetings, Production, Output, Manpower, Construction, Fertilizers, Operating costs, Tables(Data), Pest control, Nutrition, Pollution, Social effect, Research, California, *Environmental surveys, Energy consumption, Global.

This workshop was held to study further research methodologies for investigations of the interrelationships of energy, food, man and environment. The report from Phase I Workshop held June 18-19, 1974, was the prime focus of Phase II workshop. Workshop participants generally concluded that energy accounting aimed at energy and food production technologies is best accomplished by a form of process analysis. Crop output measured in the form of Kilocalories (Kcal) can be compared effectively by computing the energy inputs for each crop production process. Separate accounting for energy, labor, and land should be practiced, because within limits each of these factors can be substituted for the other. Increased energy used for both machinery construction and operating fuel can be substituted for labor, and energy used for increasing production per acre (fertilizer) can be substituted for land.

PB-263 586/0 PC A04/MF A01
Gary (Philip J.) and Associates, Marina del Rey, Calif. Micrographic Systems Consulting Services.
Development of a Model Library Microform Center
Philip J. Gary. Aug 76, 56p EPA-LIB-76-10

Keywords: Microfilm, *Libraries, Workplace layout, Film readers, Microfilm reader-printers, Information retrieval, Document storage, User needs.

This study identifies the many problem areas involved in the use of microform and presents recommendations for dealing with them.

PB-263 669/4 PC A02/MF A01
Indo-Pacific Fisheries Council, Bangkok (Thailand).
The Technology and Economics of Small-Scale Commercial Prawn ('Macrobrachium rosenbergii) Hatcheries: A Case Study in Thailand
Occasional paper
Cort W. Kloke, and Manu Potaros. May 75, 22p Rept no. IPFC-Occ.Pap.-1975/1
See also PB-263 670.

Keywords: Crustacea, Rivers, Economic analysis, Fisheries, *Thailand, Shellfish, Demand(Economics), Aquaculture, Equipment, Manpower, Pumps, Foreign countries, Management, Water supply, Reproduction(Biology), Maintenance, Larvae, Cost analysis, Tables(Data), Feeding stuffs, Marketing, Developing countries, *Fishes, Macrobrachium rosenbergii.

Several small-scale private commercial and family operated prawn hatcheries have been established in Thailand to fill the demand for juveniles for culture, and the objective of this paper is to describe and comment on the practical operation and economic experience of two such commercial hatcheries so as to give those interested in the industry and potential prawn culturists some practical insights into the requirements, potentials and problems of hatchery operation. The paper takes the form of a case study with commentary and suggestions for improvement. It is divided into three sections; (1) actual technical description of each hatchery's operation, (2) economic analysis and (3) discussion and concluding observations.

PB-263 670/2 PC A02/MF A01
Indo-Pacific Fisheries Council, Bangkok (Thailand).
The Technology and Economics of Catfish ('Clarias spp.') Farming in Thailand
Occasional paper
Cort W. Kloke, and Manu Potaros. Jun 75, 23p Rept no. IPFC-Occ.Pap.-1975/2
See also PB-263 669.

Keywords: Catfishes, Aquaculture, *Thailand, Developing countries, Economic development, Food supply, Demand(Economics), Prices, Exports, Market research, Fresh water, Foreign countries, *Fishes, Clarias batrachus, Clarias macrocephalus.

The catfish species Clarias batrachus and Clarias macrocephalus are very popular table fish in Thailand. The two species make up almost 30% of Thailand's fresh-water production with C. batrachus (Pla duk dan) accounting for about 90% of that amount. Demand for both of these fish is very strong and growing rapidly despite their high price. C. macrocephalus is the preferred species for its appearance and eating qualities and commands a higher price particularly in what appears to be a lucrative export market. The report describes research on production, consumption, and economics.

PB-263 672/6 PC A02/MF A01
Indo-Pacific Fisheries Council, Bangkok (Thailand).
Aquaculture as an Integral Part of the Agricultural Farming System. A Case Study in the North-East of Thailand
Occasional paper
Cort W. Kloke, and Manu Potaros. Jul 75, 15p Rept no. IPFC-Occ.Pap.-1975/4
See also PB-263 671.

Keywords: *Aquaculture, Agriculture, *Thailand, Developing countries, Maps, Municipalities, Farms, Boundaries, Economic development, Market research, Food supply, Foreign countries, Lagoons(Ponds), Farm crops, Statistical data, Fishes, Production, Social effect, Irrigation, Cost analysis, Income.

There is an increasing recognition and acceptance of the concept that development activities and efforts in the less developed countries of the world must be directed to the improvement of the income, security and standard of living of small low-income farmers, who constitute the vast bulk of the population of these countries. The practice of simple types of small-scale aquaculture offers excellent possibilities, particularly in Asia and the Far East, for helping to achieve the goals of diversification, increased cash incomes, improved quantity and quality of food produced for home consumption, and exploitation of un-utilized resources currently available to small farmers. Aquaculture is not new to the region, but it is not always recognized that its practice can be, and often is an integrated and natural part of the agricultural system with wide-spread involvement of small farmers. Just as most small farmers keep a few ducks and chickens to supplement their tables and their incomes, many more of them could operate a small managed fish pond.

PB-263 840/1 PC A03/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Improved Practices in Corn Production. A Guide for Peace Corps Volunteers
Program and training journal reprint series
Dave Leonard. Mar 76, 50p Rept no. Reprint Ser-7
Prepared by Peace Corps Training Center, Arecibo, Puerto Rico.

Keywords: Corn plants, Agronomy, Production, Manuals, Yield, Seeds, Planting, Fertilizers, Insect control, Weed control, Storage, Shrinkage, Fungicides, Spacing, Tropical regions, Developing countries, Instructional materials, *Agriculture.

Contents:
- Some handy conversions;
- The 'package' approach to improving crop yields;
- Some important facts on corn;
- Use high yielding varieties;
- Select seed carefully for planting;
- Treat seeds with a fungicide;
- Improved plant populations and spacing;
- Use fertilizer;
- Control insects;
- Control weeds;
- Reduce storage losses.

PB-263 849/2 PC A04/MF A01
Puerto Rico Nuclear Center, Mayaguez.
A Method for the Cultivation of the Mangrove Oyster in Puerto Rico (Metodo para el Cultivo del Ostion de Mangle en P. R.)
Kenneth W. Watters, and Pedro Acosta Martinez. Jul 76, 45p NOAA-77010308
Prepared in cooperation with Puerto Rico Dept. of Agriculture, Cabo Rojo. Lab. of Commercial Fisheries. Text in Spanish and English. Pub. in Agricultural and Fisheries Contributions, v8 n1 Jul 76.

Keywords: Oysters, Aquaculture, *Puerto Rico, Construction, Life cycles, Fishing, Harvesting, Seafood, Economic analysis, Maintenance, Reproduction(Biology), Swamps, *Fishes, Reprints, Oyster cultch, Commercial fishing, Rafts, Mangroves.

This paper describes the building and operation of oyster rafts in Puerto Rico. Basic information is given on the construction of the rafts and cultch plates, the emplacement of the rafts, the life cycle of the mangrove oyster, and harvesting and maintenance.

PB-263 943/3 PC A23/MF A01
Environmental Protection Agency, Washington, DC. Office of Water Planning and Standards.
Quality Criteria for Water
Jul 76, 537p* Rept no. EPA/440/9-76/023

Keywords: *Water pollution, *Water quality, Hazardous materials, Public health, Standards, Government policies, State government, Revisions, Pesticides, Alkalinity, Ammonia, Arsenic, Barium, Beryllium, Boron, Cadmium, Chlorine, Coliform bacteria, Color, Hardness, Iron, Dissolved gases, Chromium, Copper, Lead(Metal), Mercury(Metal), Greases, *Health, Federal Water Pollution Control Act Amendments of 1972, Water pollution standards, Heavy metals.

The Federal Water Pollution Control Act Amendments of 1972 require the Administrator of the Environmental Protection Agency to publish criteria for water quality accurately reflecting the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare which may be expected from the presence of pollutants in any body of water, including ground water. Proposed Water Quality Criteria were developed and a notice of their availability was published on Oct 26, 1973 (38 FR 29646). This present volume represents a revision of the proposed water quality criteria based upon a consideration of comments received from other Federal agencies, State agencies, special interest groups and individual scientists. Standards and their criteria are given for over 54 chemicals.

PB-264 014/2 PC A03/MF A01
California Univ., Los Angeles. School of Engineering and Applied Science.
Conversion of Cattle Manure Into Useful Products
Final rept. Jan 74-May 75
Bruce S. Dunn, John D. Mackenzie, and Eugene Tseng. Sep 76, 42p EPA/600/2-76/238
Contract EPA-R-802933

Keywords: Solid waste disposal, *Agricultural wastes, *Pyrolysis, Incinerators, Reclamation, Byproducts, Design, Carbon black, Fillers, Fertilizers, Cost analysis, Oils, Inks, Paints, Elastomers, Dehydration, Utilization, Process charting, *Animal wastes, *Waste recycling, *Manures.

The purpose of the project was to design and build a pyrolysis apparatus for cattle manure and to investigate the potential uses of the pyrolysis by-products. A pyrolysis machine of semi-continuous feed capabilities was designed and built. Various conditions of pyrolysis treatments were investigated and their influence on the amount and composition of the by-products determined. High carbon residues were found to require lower pyrolysis temperatures. The carbon content of these residues appeared to be unaffected by the geographic location of the original manure. Contact with interested parties and appropriate industries who could be prospective users of each of the products was initiated to obtain their technical expertise in evaluating these products. The pyrolysis by-products seem to have some potential industrial applications. These by-products include the solid residue, an oil fraction, and an aqueous fraction. The solid residue may serve as a carbon black substitute or as a filler material in rubber, ink, and paint. The aqueous fraction collected during pyrolysis has been evaluated for fertilizer applications.

PB-264 015/9 PC A05/MF A01
Council for Agricultural Science and Technology, Ames.
Application of Sewage Sludge to Cropland: Appraisal of Potential Hazards of the Heavy Metals to Plants and Animals
15 Nov 76, 77p 64, EPA/MCD-33

Keywords: Sludge disposal, Farms, Metals, Livestock, Cadmium, Hazards, Ground water, Surface waters, *Water pollution, Farm crops, Sewage, Water supply, *Plants (Botany), Heavy metals.

This report examines the present state of knowledge regarding the potential effects on agricultural crops

and animals by heavy metals in sewage sludges applied to cropland, as well as some consideration of possible groundwater and surface water contamination. Other potential effects associated with land application of sewage sludge are not addressed in detail.

PB-264 170/2 PC A05/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Guayule: An Alternative Source of Natural Rubber
Final rept.
Mar 77, 91p* Rept no. CIR/BOSTID-77/22
Contract BIA-K51C14200978, AID/csd-2584

Keywords: Shrubs, Natural rubber, *Deserts, *Plants(Botany), Sources, Economic development, Production, *Arid land, Farm crops, Employment, American Indians, Developing countries, Texas, New Mexico, Arizona, California, Agriculture, Financing, Quality, Extraction, *North America, *Guayule, Parthenium argentatum, Hevea brasiliensis.

The report describes a little-known bush that grows wild in deserts of North America and produces a rubber virtually identical with that from the rubber tree. It recommends funding for guayule development.

PB-264 214/8 PC A05/MF A01
SCS Engineers, Inc., Long Beach, CA.
Optimization of Office Paper Recovery Systems
Final rept.
1977, 82p* EPA/SW-135c
Contract EPA-68-01-3192

Keywords: Solid waste disposal, Refuse disposal, *Paper, Office buildings, Management planning, Separation, Collection, Containers, Feasibility, Waste processing, Economic analysis, Operating costs, *Waste recycling, Paper recycling, Source separation.

This study assesses source separation of paper as a viable resource recovery option in office buildings. Three basic approaches to office source separation are analyzed in terms of economics and performance based on their performance at 12 case study locations. The report gives an overview of source separation operations and solid waste management activities, and analyzes the major factors involved in implementing and running a source separation program. This is followed by an examination of program economics prior to and after implementation of the source separation subsystem using both the incremental and fully allocated approaches. This study concludes that source separation is practicable and economically viable, and that separation of high-grade white paper using the desk-top container approach is the most effective method.

PB-264 302/1 PC A03/MF A01
Environmental Science and Engineering, Inc., Gainesville, Fla.
Background Document: Bagasse Combustion in Sugar Mills
Robert Baker, and Thomas F. Lahre. Jan 77, 45p
EPA/450/3-77/007
Contract EPA-68-02-1402
See also PB-223 996.

Keywords: Bagasse, *Air pollution, Industrial plants, Scrubbers, Sugarcane, Physical properties, Process charting, Combustion products, Furnaces, Design criteria, Particle size distributions, Fuels, Cyclone separators, Concentration(Composition), Flue gases, Air pollution control equipment, Industrial wastes, Nitrogen oxides, Boilers, Sulfur dioxide, Refuse derived fuels, Wet methods, Emission factors.

This is a background document in support of the contents of Section 1.8 of AP-2, Compilation of Air Pollutant Emission Factors, Second Edition. It concerns the major criteria pollutants emitted during the combustion of bagasse (a fiberous waste product in a sugar cane mill) in steam boilers. The general aspects of mill operations, physical characteristics of the bagasse and its combustion, furnace designs, air pollution control devices and factors affecting emissions are described. Stack emission tests are reviewed and analyzed for inclusion in the data base for developing factors for particulate and NOx emission while firing bagasse or bagasse and fuel oil. The reliability of these factors is evaluated and presented.

PB-264 457/3 PC A06/MF A01
National Research Council, Washington, DC. Committee on Renewable Resources for Industrial Materials.
Biological Productivity of Renewable Resources Used as Industrial Materials
James S. Bethel. 1976, 112p* NSF/PRA-7501069/3/7
Contract NSF-STP75-01069
See also report dated Sep 76, PB-257 357.

Keywords: *Natural resources, *Forestry, *Agriculture, Energy conservation, Cellulose resins, Forecasting, Economics, Performance evaluation, Ethylene, Vegetable oils, Flax plants, Cotton plants, Industrial plants, Biomass, Polymers, Environmental impacts, Utilization, Wood products, Structural timber, Byproducts, Leather, Farm crops, Industrial plants, Soybean plants, Production management, Assessments, Renewable resources, Fuel substitution.

The report estimates the biological productivity of industrial renewable resources in terms of current yields, existing land bases, and increments to these bases that may reasonably be forecast by 1985 and 2000. The forecast divides naturally into two parts: the silvicultural product of wood, and products for industry from agriculture consisting chiefly of vegetable fibers, oil seeds, wool, animal fats, tallows, and hides. Wood is not only by far the most important renewable resource used for industrial materials, but also one whose production can be greatly increased if needed. Agricultural products include cotton and other vegetable fibers. Furthermore, there is little reason to believe that market demand will strain biological potential by 1985 or 2000. Under these conditions, long-term estimates of productivity become a mere exercise in imagination. Consideration is made of the energy requirements and environmental impacts associated with the implementation of the recommendations on these renewable resources.

PB-264 459/9 PC A04/MF A01
National Research Council, Washington, DC. Committee on Renewable Resources for Industrial Materials.
Extractives as a Renewable Resource for Industrial Materials
James S. Bethel. 1976, 74p* NSF/PRA-7501069/5/7
Contract NSF-STP75-01069
See also report dated Sep 76, PB-257 357.

Keywords: Organic compounds, Energy conservation, Extractives, *Natural resources, Byproducts, Wood products, Leather, *Forestry, Agriculture, Bark, Economics, Cost estimates, Residues, Vegetable oils, Tallow, Fats, Oils, Marine biology, Fuels, Industrial wastes, Utilization, Forecasting, Water pollution control, Waste treatment, Materials recovery, Aquatic plants, Polymers, Plastics, Petrochemistry, *Agriculture, Renewable sources, Naval stores, Fuel substitution.

Extractives from plants and animals are used to varying degrees in manufacturing processes of industrial goods. Bark, oleoresin, waxes, oils and fats, and tallow are covered in this report. These products are derived from forest, agricultural and marine sources. Consideration of the energy requirements and environmental impacts associated with the implementation of the recommendations are included in this report.

PB-264 543/0 PC A06/MF A01
KVB, Inc., Tustin, Calif.
Guidelines for Industrial Boiler Performance Improvement. (Boiler Adjustment Procedures to Minimize Air Pollution and To Achieve Efficient Use of Fuel)
Michael W. McElroy, and Dale E. Shore. Jan 77, 107p KVB-6001/8300-461, EPA/600/8-77/003a
Contract EPA-68-02-1074
Sponsored in part by Federal Energy Administration, Washington, D.C. Office of Energy Conservation and Environment. See also report dated Oct 75, PB-248 292.

Keywords: *Boilers, Air pollution abatement, Manuals, Smog, Particles, Flue gases, Nitrogen oxides, Oil burners, Furnaces, Combustion, Carbon monoxide, Heat transfer, Gas flow, Setting(Adjustment), Maintenance, Instructions, Performance, Efficiency, Recommendations, Monitoring, Industrial plants, Industries, *Energy conservation, *Air pollution, Combustion modification, Particulates.

Recommended procedures for improving industrial boiler performance to minimize air pollution and to achieve efficient use of fuel are given. It is intended for use by industrial boiler operators to perform an efficiency and emissions tune-up on boilers firing gas, oil, or coal. Portions of the guidelines are also intended for plant engineers interested in initiating preventive maintenance and boiler efficiency monitoring practices to maintain peak boiler operating efficiency. Background material on nitrogen oxides reduction techniques, the cost of combustion modifications, methods and equipment for efficiency improvement, and a discussion of combustion generated air pollutants are included.

PB-264 561/2 PC A12/MF A01
National Research Council, Washington, DC. Committee on Renewable Resources for Industrial Materials.
Fibers as Renewable Resources for Industrial Materials
James S. Bethel. 1976, 271p* NSF/PRA-7501069-7-7
Contract NSF-STP75-01069
See also PB-257 357.

Keywords: Natural fibers, Energy conservation, Environmental impacts, Assessments, Cost estimates, Economics, Paper industry, Textile industry, Plants(Botany), Fiber crops, Cotton plants, Wool, Hair, Cellulosic resins, Synthetic fibers, *Leather, Feathers, Performance evaluation, Forecasting, Supply management, Paperboards, Forestry, Law enforcement, Water pollution, Air pollution, Utilization, Byproducts, *Fibers, *Paper, Renewable resources.

Contents:
- The pulp, paper and paperboard industry introduction--(Assessment of the industry, some factors affecting the industry, enhancement of availability and utility of materials with reduction in costs, enhanced role of renewable fiber resources - an overview of product substitution, identification of educational roles and needs, and recommended research, its costs and returns, and time schedules);
- Plant fibers other than wood and cotton;
- The textile industry--(Cotton, wool and mohair, the cellulosics and synthetic fibers);
- Feathers, furs and leather.

PB-264 594/3 PC A13/MF A01
Texas A and M Univ., College Station. Dept. of Marine Resources Information.
Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference (First) Held in Corpus Christi, Texas on March 8-10, 1976. Volume II
Bryant F. III Cobb, and Alexandra B. Stockton. Oct 76, 277p TAMU-SG-77-105, NOAA-77010401
Grant NOAA-04-6-158-44012
See also Volume 1, PB-263 399.

Keywords: *Fisheries, Fishes, Shellfish, Meetings, Tropical regions, Lipids, Metabolism, Catfishes, Feeding stuffs, Meat, Food processing, Mexico Gulf, Cod, Fresh water fishes, Crabs, Economic development, Market research, Lobsters, Aquaculture, Sea Grant program, Subtropical regions.

This collection of 18 papers constitutes the second volume of the Proceedings of the Tropical and Subtropical Fisheries Technological Conference held March 8-10, 1976 at Corpus Christi, Texas. Titles included are: Transfer of Lipids through marine food chains; Lipid metabolism in Channel Catfish; Flavor problems in fish culture; Organoleptic and biochemical comparisons of cage raised and wild Striped Mullet; Utilization of insects as complementary diet in Channel Catfish feeding; Utilization of small mullet by a cold smoking process; Potential Demersal Fish fisheries in the Northwest Gulf of Mexico; Notes on the underutilized fishery resources of the Gulf of Mexico; Salt minced cod; Yield and quality of mechanically separated flesh from several species of cultured freshwater fish; The effect of washing on color and texture of minced croaker; Functional properties influencing texture; Selected textural properties of cooked minced Atlantic Cutlass fish sticks; Roller extraction of crab meat; The economics of the commercial development of Gulf of Mexico bottomfish; Market potential for fish as an extender in meat products; An economic analysis of effort and yield in the Florida Spiny Lobster in-

dustry; and Publicly supported seafood product development research.

PB-264 638/8 PC A06/MF A01
Development Planning and Research Associates, Inc., Manhattan, Kans.
Feasibility of a Beef Processing Plant on the Blackfeet Indian Reservation
Nov 76, 103p P-192, EDA-77-054
Grant EDA-05-06-01520

Keywords: Economic development, American Indians, Regional planning, Rural areas, *Industrial plants, Meat, Processing, Economic analysis, *Food products, Technical assistance project, Blackfeet Indians, Indian reservations, Meat packing plants.

The study gives an analysis of a proposed beef packing plant with respect to markets and raw material supplies. The plant would be situated in an area of large surpluses of both livestock feed and calf supplies. It would be necessary to tie the packing plant to a feedlot. Ownership of both enterprises was to be integrated and the purpose of the feedyard was to even slaughter cattle supplies to the packing plant. Both locker-type plants and commercial plants are to be constructed. The Blackfeet Tribe in searching for development possibilities for their tribally controlled acres on the Reservation proposes to investigate the establishment of a beef packing plant.

PB-264 738/6 PC A03
Louisiana State Univ., Baton Rouge.
Pond Culture of the Malaysian Prawn, 'Macrobrachium rosenbergii' (de Man), in South Carolina, 1974-1975
Theodore I. J. Smith, Paul A. Sandifer, and William C. Trimble. 1976, 26p Contrib-53, NOAA-77011711
Grant NOAA-04-5-158-5, NOAA-04-6-158-44009
Sponsored in part by Coastal Plains Regional Commission, Washington, D.C. Pub. in Proceedings of Annual Meeting (7th), World Mariculture Society, San Diego, Calif. 25-29 Jan 76 p625-645 1976. (Pub. by Louisiana State Univ., Baton Rouge, La..

Keywords: *Ponds, Crustacea, *Aquaculture, Mortality, Feasibility, Growth, Survival, Yield, Management, Earth fills, South Carolina, Sea Grant program, Macrobrachium rosenbergii, Mariculture.

The feasibility of growing Macrobrachium rosenbergii commercially in ponds is under investigation in South Carolina. Results of 1974 and 1975 pond studies indicate a favorable outlook for eventual commercial production. Excellent growth and survival rates were obtained under conditions which were considered marginal at times. Considerable production was achieved even when newly metamorphosed postlarvae were stocked into ponds. However, increased production and greater final prawn size resulted when larger juveniles were stocked. Higher yields are anticipated from more suitable ponds and as better pond management techniques are developed and applied.

PB-264 900/2 PC A06/MF A01
Ohio State Univ., Columbus. Dept. of Civil Engineering.
A Study of Runoff from Small Rural Watersheds in Response to Completed and Proposed Land Use Changes
Master's thesis
Michael Joseph Smith. 1972, 115p OWRT-B-005-OHIO(13)

Keywords: *Hydrology, *Land use, Runoff, Watersheds, Strip mining, Agriculture, Water quality management, Industrial waste treatment, Theses, Upgrading, Sewage treatment, Tables(Data), Ohio, *Water quality, Agricultural watersheds, Cumberland Plateau, Allegheny Plateau.

The thesis pertains to the effect of land use and management upon the hydrology and water quality of two experimental watersheds; one, an agricultural area containing remnants of strip mining operations, and the other, a mixed cover agricultural watershed about to be subjected to a sharp upgrading of treatment. The analysis techniques used illustrate some procedures for determining changes in watershed hydrology. A longer period of study is recommended to make positive statements regarding changes in hydrologic response.

PB-265 105/7 PC A06/MF A01
Maryland Univ., College Park. Agricultural Experiment Station.
Solar Energy Applications in Agriculture: Potential, Research Needs, and Adoption Strategies
Filmore E. Bender, Andrew M. Cowan, Richard W. Dillon, James D. Hansford, Jr, and David A. Hurdis.
Jan 76, 119 A-184, NSF/RA-760021
Contract USDA-12-14-1605-106, NSF-PTP75-10573
See also PB-255 928.

Keywords: *Agriculture, Solar heating, Solar drying, Solar space heating, Irrigation, Farm crops, Farm buildings, Greenhouses, Natural gas, Liquefied petroleum gas, Electricity, Fuel oils, Kerosene, Coal, Prices, Economic analysis, Recommendations, *Solar energy.

Objectives pursued in this study are: (1) assessment of present agricultural operations to determine those with potential for use with solar energy; (2) development of recommendations for an overall experimental research program to establish the technical and economic feasibility of using solar energy in agricultural operations; and (3) formulation of recommendations for strategies to achieve adoption of solar energy components and systems in agriculture. Applications of solar energy to the following aspects of agriculture are examined: grain drying, tobacco curing, peanut drying, broiler housing, swine production, farm housing, greenhouses, and irrigation. Current fuel prices for each of the agricultural regions (determined by crop production) are also reviewed.

PB-265 161/0 PC A09/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Making Aquatic Weeds Useful: Some Perspectives for Developing Countries
Survey rept.
1976, 184p*
Contract AID/csd-2584

Keywords: *Aquatic weeds, Weed control, Developing countries, Wildlife, Utilization, Food supply, Management, Feeding stuffs, Sewage treatment, Livestock, Fishes, Cutting, Dewatering, Ruminants, Food consumption, Aquatic animals, Inland waterways, Fertilizers, Grasses, Tropical regions, Mammals, Trichechus, Herbivores.

This report examines methods for controlling aquatic weeds and using them to best advantage, especially those methods that show promise for less-developed countries. It emphasizes techniques for converting weeds for feed, food, fertilizer, and energy production. It examines, for example, biological control techniques in which herbivorous tropical animals (fish, waterfowl, rodents, and other mammals) convert the troublesome plants directly to meat. Though the techniques described in this report have been selected for their applicability in less-developed countries, many are relevant to industrialized countries. Both types of country face a future in which food production will need to depend more and more on the effective management of natural systems, such as waterways.

PB-265 232/9 PC A05/MF A01
Big Chief Roofing Co., Ardmore, Okla.
Water Reuse in a Paper Reprocessing Plant
Final rept.
Leale E. Streebin, George W. Reid, Paul Law, and Charles Hogan. Oct 76, 95p EPA/600/2-76/232
Grant EPA-S-801206
Prepared in cooperation with Oklahoma Univ., Norman. School of Civil Engineering and Environmental Science.

Keywords: *Paper industry, Materials recovery, *Water pollution, By-products, Industrial wastes, Cost estimates, Circulation, Performance evaluation, Process charting, Manufacturing, Microorganism control(Water), Corrosion, Economic analysis, Slime, Foams, *Water use, Solid waste disposal, Liquid waste disposal, Waste recycling, *Waste water reuse.

This project was undertaken to determine the feasibility of water reuse in a paper reprocessing plant with the goal being to 'close the loop' or to demonstrate zero discharge technology. Before the project began, Big Chief Roofing Company at Ardmore, OK, was discharging 7.89 l/sec (125 gpm). Normal operation is now zero discharge with approximately 0.76 l/sec (12 gpm) fresh water make-up replacing evaporative losses. However, weekly clean-ups still result in an effluent of approximately 15.14 cu m (4000 gal) a week. Additional clear water storage capacity could eliminate this weekly discharge. Project scope included identifying and solving problems resulting from increased recycle of process water, and determining costs, benefits, and effect on product quality. The favorable cost/benefit ratio experienced at the plant demonstrated an economic advantage of in-plant control over end-of-pipe treatment. Attaining zero discharge operation has the further benefit of eliminating the problems, cost, and liabilities associated with operation under a discharge permit. Economic benefits observed during zero discharge operation included reduced water supply costs, reduced wastewater treatment costs, improved yield, improved drainage and greater dryer section production. The benefits were partially offset by shorter felt lives, increased corrosion control cost, and process modification cost. No degradation of product quality was observed.

PB-265 237/8 PC A03/MF A01
Western Forest Products Lab., Vancouver (British Columbia).
Lathe Operators' Manual. Part II. Pressure Bars. Their Operation and Maintenance
Information rept.
W. V. Hancock, and O. Feihl. Oct 76, 39p* Rept no. VP-X-158
See also PB-240 534.

Keywords: Lathes, Manuals, Woodworking machinery, Veneers, Peeling, Plywood, Rollers, Bars, Setting(Adjusting), Canada, *Machine tools, Pressure bars.

The development, design and operation of various types of pressure bars for veneer lathes is discussed in detail. The importance is stressed of a high level of maintenance and of accurate adjustment of the various lathe settings. The techniques for setting a veneer lathe are given together with a description of the special instrumentation that has been developed for this purpose.

PB-265 357/4 PC A04/MF A01
Snokist Growers, Yakima, Wash.
Fruit Cannery Waste Activated Sludge as a Cattle Feed Ingredient
Larry A. Esvelt. Sep 76, 66p EPA/600/2-76/253
Grant EPA-S-603307
Prepared by Bovay Engineers, Inc., Spokane, Wash.

Keywords: Materials recovery, *Food processing, Feeding stuffs, Activated sludge process, Canneries, Feasibility, Animal nutrition, Byproducts, Fruits, Industrial waste treatment, Dewatering, Beef cattle, Centrifuging, Water pollution control, Nutrients, Process charting, Performance evaluation, *Waste recycling, Solid waste disposal.

The feasibility of sludge disposal, from a fruit processing waste activated sludge treatment system, by dewatering and using the dewatered biological sludge solids as cattle feed was evaluated by Snokist Growers at Yakima, Washington. Dewatering of the biological sludge utilizing pilot-scale and prototype-scale basket centrifuges resulted in consistently dewatering to 7-1/2% to 9% dry solids. Digestibility and metabolizability of rations containing 2.3% and 4.5% biological solids appeared equal to a control ration, but a ration containing 9.2% biological solids appeared lower. Twenty-four uniform yearling steers were divided into four lots of six each and finish fed a control ration and rations containing 2.3%, 4.6%, and 6.9% sludge solids on a dry matter basis for 165 days. They did not show any adverse effects of the sludge incorporation into their rations. It appeared that a low quantity of sludge (2.3% dry solids) actually enhanced the weight gain performance and carcass quality of these animals. The cost of a dewatering installation will require that the canney receive remuneration for use of the waste activated sludge as cattle feed in order to make a full-scale dewatering project feasible. The calculated value of the biological solids incorporated into the rations was in the range of $0.092 to $0.148 per kg dry solids.

PB-265 749/2 PC A06/MF A01
North Dakota State Univ., Fargo. Dept. of Agricultural Economics.

The Economic Feasibility of Establishing Oil Sunflower Processing Plants in North Dakota
Delmer L. Helgeson, David W. Cobia, Randal C. Coon, Wallace C. Hardie, and LeRoy W. Schaffner.
Apr 77, 110p Bull-503, EDA-77-080
Grant EDA-05-06-01485
Errata sheet inserted.

Keywords: Economic development, Oilseed crops, Food processing, Flax plants, Manufacturing, Economic impact, Feasibility, Marketing, Objectives, Technical assistance, Variable costs, Prices, North Dakota, *Vegetable oils, *Sunflower.

The purpose of this report was to explore the economic feasibility of establishing processing facilities for oil-type sunflowers in North Dakota. A broad set of topics was covered because production, processing and marketing of sunflowers and sunflower products in the U.S. are relatively recent. Historical sunflower production patterns were presented, together with two estimates of future production. One estimate was based on an attitudinal survey of farmers and a second on a maximum long-run projection for North Dakota. The supply of whole seed sunflowers from current and the two projections was related to processing requirements for each of the four plant sizes. The economic impact of each of the model sunflower processing plants on multicounty regions in which they might locate was estimated for the construction and operational phases.

PB-265 918/3 PC A02
Puerto Rico Nuclear Center, Mayaguez. Radioecology Div.
Culture of the Mangrove Oyster, 'Crassostrea rhizophorae' Guilding, in Puerto Rico
Kenneth W. Watters, and Thomas E. Prinslow. Jan 77, 17p NOAA-77031510
Pub. in Proceedings of Annual Workshop World Mariculture Society (6th), at Seattle, Washington, on January 27-31, 1975.

Keywords: Oysters, *Aquaculture, *Puerto Rico, Feasibility, Estuaries, Swamps, Salinity, Temperature, Lagoons(Ponds), Harvesting, Growth, Crassostrea rhizophorae, Reprints, Oyster clutch.

Experiments to determine commercial feasibility of mangrove oyster culture in Puerto Rico have been underway since early 1973. Most of the work has been carried out in Rincon Lagoon, a rich mangrove-lined estuary subject to periodic salinity fluctuations. The bulk of commercial oyster harvesting on the island is presently carried out in this lagoon. A revised method of cultching, consisting of 46 x 71 cm frames suspended from rafts, was used. The frames, utilizing several materials such as concrete-coated plywood and plastic sheeting showed sustained mean growth rates of 0.7 mm per day, with maximum individual rates of 1.4 mm per day. A program monitoring spatfall, salinity, and temperature was carried out in an effort to determine the timing of natural spatfall in the lagoon. It appeared that spatfall closely followed drops in salinity.

PB-266 126/2 PC A06/MF A01
Western Forest Products Lab., Vancouver (British Columbia).
Kiln Drying of Western Canadian Lumber
Information rept.
G. Bramhall, and R. W. Wellwood. Nov 76, 119p*
Rept no. VP-X-159
Prepared in cooperation with British Columbia Univ., Vancouver. Faculty of Forestry.

Keywords: Lumber, Kilns, Drying, Manuals, Softwoods, Hardwoods, Moisture content, Defects, Maintenance, Humidity, Standards, Measurement, Specifications, Dictionaries, Tables(Data), Describing, *Canada, *Industrial plants, *Wood, *Drying.

This manual provides information to kiln operators in the drying of softwoods with some reference to hardwoods native to western Canada. Chapters deal with wood structure, wood moisture relations, factors affecting drying, drying defects, kiln operation and maintenance, quality control, transit and storage problems and economic aspects of drying. More than 40 schedules for various species and grades are provided. Also included are a relative humidity-equilibrium moisture content chart in Celsius, tables to assist in calculation of schedules, a graph to indicate average moisture content necessary to meet drying standards, metric-English conversions, a glossary of lumber-drying terms, properties of steam, and a short description of special drying techniques.

PB-266 205/4 PC A06/MF A01
American Inst. of Biological Sciences, Arlington, VA.
Analysis of Specialized Pesticide Problems Invertebrate Control Agents - Efficacy Test Methods. Volume III. General Soil Treatments
Mahlon Fairchild, Christian C. Burkhardt, J. Marshall Magner, William Campbell, and Gerald Musick. Jan 77, 106p* EPA/540/10-77/007
Contract EPA-68-01-2457
See also Volume 2, PB-266 204.
Also available in set of 8 reports PC E14, PB-266 202-SET.

Keywords: Insecticides, *Pesticides, *Soils, Vegetable crops, Corn plants, Peanut plants, Tobacco plants, Sugar crops, Pest control, Methodology, Effectiveness, Tests, Insect control, Insects, Parasites, Evaluation, Dosage, *Crops, *Vegetables.

The testing of soil insecticides for efficacy is extremely complex and it would be impossible to put together guidelines for all soil insecticides; therefore, an attempt has been made to pull together some test methods for major pests on a few commodities. The commodities selected are corn, vegetables, sugarbeets, peanuts and tobacco. It would be impossible to cover all pests that might require soil insecticides under each of the commodities chosen.

PB-266 300/3 PC A06/MF A01
ACTION/Peace Corps, Washington, DC.
The Photonovel: A Tool for Development
Program and training journal manual series
Daniel Weaks, and Eliza Sola. Sep 76, 113p Rept no. Manual Ser-4

Keywords: Public health, Specialized training, Documents, *Health education, Manuals, Toilet facilities, Construction, Developing countries, Rural areas, Populations, Photographs, Instructions, Information, Materials, Methodology, Ecuador. *TrainingPhotonovels, Rural populations, Developing countries.

Since 1961 Peace Corps volunteers have worked at the grass roots level in developing countries to help peoples to use new ideas that utilize locally available resources. One approach that has proven effective is the photonovel, in which a series of pictures outlines a step by step process to achieve a community goal. In each picture a white 'balloon' contains dialogue and indicates the speaker. The photonovel has achieved results where other media have failed. The present material deals with sanitary facilities in Ecuador.

PB-266 332/6 PC A03/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Building to Resist the Effect of Wind. Volume I. Overview
Building science series (Final)
N. J. Raufaste, R. D. Marshall, and S. A. Kliment.
May 77, 38p Rept no. NBS-BSS-100-1
Library of Congress catalog card no. 77-600013. Prepared in cooperation with Kliment (Stephen A.), New York.
Also available in set of 5 reports PC E08, PB-266 331-SET.

Keywords: Residential buildings, *Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries, *Buildings, Low rise buildings, Wind resistant structures.

This document presents the background, goals, procedures and results of a project to develop improved design criteria that would make low-rise buildings in developing countries better able to withstand the effects of extreme winds. The project stemmed from the belief that additional research on wind was needed to reduce loss of life and property, human suffering, disruption of productive capacity and costs of disaster relief. The 3 1/2 year project began in early 1973 and produced these results: the development of improved design criteria; a methodology for the estimation of extreme wind speeds; the development of wind tunnel modeling techniques; a heightened awareness of the wind problem and the need to guard against it; the emergence of useful working relationships between NBS/AID and public and private decision makers in developing countries subject to extreme winds, especially the Philippines, Jamaica and Bangladesh; and the documentation of important information in the areas of wind design speeds and pressure coefficients, economic forecasting, socio-economic and architectural concerns, and construction detailing practices. Also during the project, a program began in the training of professionals and technicians in developing countries to carry out wind measurements and analyses. In addition, methods to ensure transfer of information to user groups were employed.

PB-266 333/4 PC A03/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Building to Resist the Effect of Wind. Volume II. Estimation of Extreme Wind Speeds and Guide to the Determination of Wind Forces
Final rept. 1975
R. D. Marshall. Jul 75, 33p Rept no. NBS-BSS-100-2
Grant PASA-TA(CE)-04-73
Prepared in cooperation with Kliment (Stephen A.), New York. Library of Congress catalog card no. 77-600013. See also Volume 1, PB-266 332.
Also available in set of 5 reports PC E08, PB-266 331-SET.

Keywords: Residential buildings, *Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries, *Buildings, Low rise buildings, Wind resistant structures.

This paper briefly describes some of the more common flow mechanisms which create wind pressures on low-rise buildings and the effects of building geometry on these pressures. It is assumed that the basic wind speeds are known and a procedure is outlined for calculating design wind speeds which incorporates the expected life of the structure, the mean recurrence interval, and the wind speed averaging time. Pressure coefficients are tabulated for various height-to-width ratios and roof slopes. The steps required to calculate pressures and total drag and uplift forces are summarized and an illustrative example is presented.

PB-266 334/2 PC A04/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Building to Resist the Effect of Wind. Volume III. A Guide for Improved Masonry and Timber Connections in Buildings
Building science series (Final) 1976
S. George Fattal, G. E. Sherwood, and T. L. Wilkinson. May 77, 60p Rept no. NBS-BSS-100-3
Grant PASA-TA(CE)-04-73
Prepared in cooperation with Forest Products Lab., Madison, Wis. Library of Congress catalog card no. 77-600013. See also Volume 2, PB-266 333.
Also available in set of 5 reports PC E08, PB-266 331-SET.

Keywords: Residential buildings, *Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries, *Buildings.., Low rise buildings, Wind resistant structures.

This report investigates the use of connectors for masonry and timber elements in low-rise buildings. Connector characteristics and construction details that improve a building's response to extreme wind effects are given primary emphasis. Recommendations include improvements through better utilization of connector technology showing good feasibility of introduction in developing countries. The building systems considered in this study fall within the low to moderate cost category.

PB-266 335/9 PC A03/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Building to Resist the Effect of Wind. Volume IV. Forecasting the Economics of Housing Needs: A Methodological Guide
Building science series (Final) 1976
Joseph G. Kowalski. May 77, 40p Rept no. NBS-BSS-100-4

Grant PASA-TA(CE)-04-73
Library of Congress catalog card no. 77-600013. See also Volume 3, PB-266 334.
Also available in set of 5 reports PC E08, PB-266 331-SET.

Keywords: Residential buildings, *Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries, *Buildings, Low rise buildings, Wind resistant structures.

The Agency for International Development sponsored with the NBS, a 3 1/2 year research project to develop improved design criteria for low-rise buildings to better resist the effects of extreme winds. Housing is probably the single most important consumer good in most economies. Measuring the size of a region's unmet housing need is a first step to planning and implementing improvements in housing conditions. This report analyzes the concept of housing needs in an economic framework. A methodology for estimating and projecting housing needs at the regional level is developed. The methodology attempts to make explicit the income redistribution intent which is the core meaning behind the concept of housing needs. Project results are presented in five volumes. Volume 1 gives an overview of the research activities, accomplishments, results and recommendations. Volume 2 presents a methodology to estimate design wind speeds and a guide to determine wind forces. Volume 3 discusses a guide for improved use of masonry fasteners and timber connectors. Volume 4 furnishes a methodology to estimate and forecast housing needs at a regional level. Socio-economic and architectural considerations of the Philippines, Jamaica and Bangladesh are presented in Volume 5.

PB-266 336/7 PC A03/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Building to Resist the Effect of Wind. Volume V. Housing in Extreme Winds: Socio-economic and Architectural Considerations
Building science series (Final) 1976
Stephen A. Kliment. May 77, 41p Rept no. NBS-BSS-100-5
Grant PASA-TA(CE)-04-73
Prepared by Kliment (Stephen A.), New York. Library of Congress catalog card no. 77-600013. See also Volume 4, PB-266 335.

Keywords: Residential buildings, *Wind pressure, Design criteria, Disasters, Construction materials, Construction management, Socioeconomic status, Technology transfer, Bangladesh, Philippines, Jamaica, Developing countries, *Buildings, Low rise buildings, Wind resistant structures.

Typical socio-economic conditions in the Philippines, Jamaica, and Bangladesh are identified. These conditions include strong respect for traditional materials and methods of house construction, and suspicion of innovative forms and approaches; a rising proportion of urban poor who live in squatter settlements; and a rising ratio of inhabitants whose incomes are at a level where they cannot afford housing of any kind. The importance of land from a social standpoint is stressed. The report reviews the sites and services concept whereby low income persons are provided a site equipped with basic utilities but must erect and maintain a house upon it. Recommendations include: placement of buildings to exploit terrain; adherence to good practices in the configurations of the main elements of a house (these are shown by means of simple drawings); and use of cheap, strong and locally available materials.

PB-266 709/5 PC A02/MF A01
New Mexico State Univ., University Park. Water Resources Research Inst.
Protein Production by Russian Thistle: Effects of Water and Nitrogen on Protein Yields
Technical completion rept.
James H. Hageman, and James L. Fowler. Mar 77, 20p WRRI-085, OWRT-A-049-NMEX(2)
Contract DI-14-34-0001-6032
Prepared by New Mexico State Univ., University Park. Dept. of Chemistry.

Keywords: Feeding stuffs, Proteins, Forage crops, Water consumption, Droughts, Arid land, Yield, Toxic tolerances, Inorganic salts, Irrigation, Efficiency, Nutrients, Vegetation, Acclimatization, New Mexico, *Fertilizers, Salsola, *Water use.

The purpose was to determine whether Russian thistle (Salsola spp.) might have potential as either a protein source or a forage under conditions of restricted water. Salsola was chosen because it was reported to be a C4 plant which is efficient in water use, drought resistant, salt tolerant and because it had been used as a feed previously. These results compare favorably with alfalfa, which is the most widely grown forage in New Mexico.

PB-267 262/4 PC A17/MF A01
Lyon Associates, Inc., Baltimore, Md.
Laterite and Lateritic Soils and Other Problem Soils of the Tropics. Volume I
W. J. Morin, and Peter C. Todor. 1975, 376p* AID/csd-3682-Vol-1
See also Volume 2, PB-267 263.

Keywords: Soil mechanics, Tropical regions, *Laterites, Weathering, Geology, Volcanic ejecta, Soil tests, Clay soils, Standards, Flexible pavements, Gravel, Photointerpretation, *Roads, Design, Specifications, Geography, *Soil stabilization, Soil classification, *Soils.

The report documents five years of worldwide research resulting in the following useful information for engineers: (1) Comprehensive descriptions of tropical soils, chemical mineralogical and physical properties and engineering behaviors, and appropriate classifications; (2) A new pavement design procedure developed for tropical applications; (3) A practical range of strength values attainable through stabilization; (4) Specifications for common tropical materials; (5) Methods of working and using problem soils such as black clay and volcanic soils.

PB-267 263/2 PC A05/MF A01
Lyon Associates, Inc., Baltimore, Md.
Laterite and Lateritic Soils and Other Problem Soils of the Tropics. Volume II. Instruction Manual
W. J. Morin, and Peter C. Todor. 1975, 96p* AID/csd-3682-Vol-2
See also Volume 1, PB-267 262.

Keywords: Soil mechanics, Tropical regions, *Laterites, Manuals, Weathering, Laboratory tests, Field tests, Flexible pavements, Soil properties, Clay soils, Volcanic ejecta, Design criteria, *Roads, Specifications, Roadbeds, *Soils, *Soil Stabilization.

The report documents five years of worldwide research resulting in the following useful information for engineers: (1) Comprehensive descriptions of tropical soils, chemical mineralogical and physical properties and engineering behaviors, and appropriate classifications; (2) A new pavement design procedure developed for tropical applications; (3) A practical range of strength values attainable through stabilization; (4) Specifications for common tropical materials; (5) Methods of working and using problem soils such as black clay and volcanic soils.

PB-267 295/4 PC A06/MF A01
Missouri Univ.-Rolla. Rock Mechanics and Explosives Research Center.
Rapid Excavation of Rock with Small Charges of High Explosives
Final rept.
George B. Clark, and Ronald R. Rollins. Nov 76, 121p BuMines-OFR-98-77
Contract H0252052

Keywords: *Tunneling, Underground mining, Blasting, Explosive charges, Blast loads, Detonators, Earth movement, Fragmentation, Rapid excavation, Air blast.

The purpose of this investigation was to determine the feasibility of designing and testing the elements of a small-charge blasting system that will eliminate, or reduce to acceptable levels, most of the undesirable features of current underground drill and blast systems, that is, (1) air blast, (2) ground vibrations, (3) flying fragments, (4) overbreak and fracture of surrounding rock, and (5) the cyclic nature of drill and blast operations. The experimentation was conducted in tunnels in granite, and the results indicated that the basic technical concepts of the project were achieved. The next step is to design, construct, and test a prototype machine.

PB-267 358/0 PC A02/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Technical Services.
Good Work Practices for Tannery Workers
Apr 76, 25p Rept no. NIOSH-76/157

Keywords: Industrial hygiene, Tanning materials, Safety, Hazards, Methodology, Chemical compounds, Accident prevention, Recommendations, Personnel management, *Leather, Processing, Precautions, Tanning industry, Occupational safety and health.

The booklet contains occupational health and safety information for tannery workers. Common hazards are identified and safe work practices suggested. Chemicals used in a tannery are listed along with precautions to take when using them.

PB-267 371/3 PC A09/MF A01
Environmental Protection Agency, Washington, DC. Office of Water Supply.
Manual of Water Well Construction Practices
1977, 178p* Rept no. EPA/570/9-75/001

Keywords: *Water wells, Construction management, Well tests, Well surveys, Well casings, Well logging, Geophysical prospecting, Construction materials, Payment, Standards.

The report contains standards for water well construction developed by a committee comprised of technical and well contractor personnel. The standards will serve to educate the public and upgrade existing well construction techniques in order to protect ground water reserves.

PB-267 527/0 PC A06/MF A01
Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
Industrial Prospects for Chitin and Protein from Shellfish Wastes
Dale Hattis, and Albert E. Murray. 1977, 107p*
MITSG-77-3, CPA-76-7, NOAA-77041808
Grant NOAA-04-5-158-1
Index No. 77-703-Zle.

Keywords: *Chitins, *Proteins, Shellfish, Food supply, Industrial wastes, Shrimps, Crabs, Supply(Economics), Food analysis, Byproducts, Marketing, Ion exchange resins, Paper industry, Coagulants, Production, Demand(Economics). Cost analysis, Polysaccharides, Fibers, Tables(Data), *Fishes, Sea Grant program, Chitosan.

Although chitin and derivatives of chitin have been studied for many years and their intriguing chemical properties have been known, commercial utilization has been almost nonexistent. This study was designed to address the industrial prospects for utilization of chitin. A business strategy involving both chitin and protein from shellfish has been developed and evaluated. The strategy appears to offer a rational and profitable way to resolve the dilemma by treating chitin as a by-product of a protein recovery process that, in some cases, may be profitable even in the complete absence of any markets for the chitin. This strategy should assure availability of dried shell waste in sufficient quantities to make possible production of chitin in amounts needed to supply initial markets. Likely markets are proposed based on an extensive analysis of the literature of chitin applications and markets for similar chemicals.

PB-267 598-T PC A07/MF A01
Agricultural Research Service, Washington, D.C.
Machine Milking and Its Effects on Cows
I. G. Velitok. 1967, 150p Rept no. TT-75-52056
Trans. of mono. Maschinnoe Doenie i Razdoi Korov, Kiev, 1967, by R. S. Chakravarthy. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program. Errata sheet inserted.

Keywords: *Agricultural machinery, *Milk, Dairy cattle, Animal physiology, Theory, Evaluation, Yield, Books, Translations, *USSR, *Dairies, *Animal husbandry, Milking machines.

This monograph presents experimental findings by the author as well as the results of other research here and abroad on the physiology of machine milking of cows. The problems of the physiology of milk letdown in cows with the use of milking machines of different types have been studied with due allowance for the peculiarities of the functioning of the milk glands. Specifically, a method is proposed for the physiological evaluation of the effects of using a milking machine. Some tips are offered, such as how to organize machine milking in such a way that the reflex milk letdown is not disturbed. The book discusses the theoretical and practical aspects of the physiology of milking and increasing milk yield with milking machines. This monograph is intended for livestock experts, animal breeders, veterinarians, physiologists, engineers and research workers engaged in the study of the problems of machine milking of cows.

PB-267 947/0 PC **A03**/MF **A01**
Applied Technology Council, Palo Alto, Calif.
Review of Literature on Earthquake Damage to Single-Family Masonry Dwellings
Rodger D. Benson. 29 Apr 77, 31p
Contract HUD-H-2390
Prepared by Benson and Gerdin, Inc., Phoenix, Ariz.

Keywords: Residential buildings, Masonry, Earthquakes, Damage assessment, Earthquake resistant structures, Construction materials, Questionnaires, Surveys, *Buildings, *Houses, *Earthquake engineering, Western Region(United States).

The report contains a review and evaluation of information concerning the behavior of single-family masonry dwellings in Zone 2 earthquake areas of the United States (1973 Uniform Building Code classification). In general, reinforced masonry has exhibited satisfactory performance, sustaining little or no damage in moderate earthquakes. Reported damage is often associated with poor workmanship/inspection. Unreinforced masonry (old and new) and masonry chimneys have exhibited poor performance. Available data has been found to be limited and general in nature.

PB-267 949/6 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. National Economic Analysis Div.
Spain's Leather Industry: Prospects for Blue Chrome (Wet-Blue) Processing
Final rept.
Antonio Del Valle Pintos, and Harold H. Taylor. May 77, 41p Rept no. AGERS-30
Grant NSF-AG-482
Prepared in cooperation with Instituto Nacional de Investigaciones Agrarias, Zaragoza (Spain). Dept. of Economics and Sociology.

Keywords: *Spain, Tanning materials, Industrial wastes, Water pollution control, Manufacturing, Substitution, Employment, Hides, Cattle, *Water pollution, *Leather Wet blue leather, Leather industry.

Rapid expansion of the Spanish leather-goods industry has created a serious problem of pollution from tannery effluents. The use of chrome (wet-blue) leather in Spanish tanneries would reduce the pollution caused by cleaning and dehairing of conventional salt-cured hides. It would also reduce the number of workers required in tannery beamhouses, where cleaning occurs. Responding to a 1976 survey, tanners who produced about 80 percent of Spain's finished leather output said they would increase imports of blue chrome leather provided uniform grades and standards could be established to reduce the variability of quality. Tanners estimated that elimination of the beam-house operation might reduce hide finishing costs by 15 percent, and thus most would not be willing to pay more than 15-percent price premium for wet-blue hides. The tanners also indicated that if pollution laws were enforced, they would be more willing to substitute blue chrome for salt-cured hides since this substitution would reduce the beamhouse operation. Any change in demand for blue chrome hides would affect the United States, which supplies about one-fifth of Spain's hide imports.

PB-267 970/2 PC **A04**/MF **A01**
Integrative Design Associates, Inc., Washington, DC.
Appropriate Technology-A Directory of Activities and Projects
1977, 75p NSF/RA-770064
Grant NSF-ERS76-21350

Keywords: *Regional planning, Directories, Ecology, Ecological succession, Technology, Resources, Utilization, Conservation, Waste management, Recommendations, Environmental surveys, Data acquisition, Problem solving, Constraints, District of Columbia, Research projects. Research, Waste recycling.

This is a directory of United States activities in appropriate technology--technology that incorporates a concern for maintenance of the ecological balance by increasing the use of renewable resources, extending recycling and diminishing waste, and fostering the resource independence of local areas. The authors survey the field to learn from individuals and groups about the scope of their activities, the legal and technical problems they are facing in moving from idea to application, and their recommendations for federal activity in support of appropriate technology. This directory is, in part, a compilation of the descriptions of activities of the survey respondents. The descriptions of activities are extracted from a survey sent to individuals and groups as part of this project. Opinions on major obstacles to the further development of appropriate technology are noted.

PB-268 029/6 PC **A05**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, Ohio. Water Supply Research Div.
Manual of Treatment Techniques for Meeting the Interim Primary Drinking Water Regulations
Thomas J. Sorg, O. Thomas Love, Jr, and Gary S. Logsdon. May 77, 80p* Rept no. EPA/600/8-77/005

Keywords: Manuals, *Water treatment, Potable water, Regulations, Radioactive contaminents, Chemical removal(Water treatment), Inorganic compounds, Water pollution control, Arsenic, Borium, Cadmium, Chromium, Fluorides, Lead(Metal), Mercury(Metal), Organic compounds, Inorganic nitrates, Selenium, Cost analysis, Turbidity, Disinfection, Chlorination, Ozone, Chlorine oxides, Byproducts, Pesticides, Trace elements, Lime, Ion exchanging, Reverse osmosis, Endrin, Chlorine organic compounds, Coliform bacteria, Microorganism control(Water), *Water quality, Methoxchlor, Lindane, D 2-4 herbicide, Silvex, Safe Drinking Water Act of 1974.

Following the passage on December 16, 1974, of Public Law 93-523, The Safe Drinking Water Act, the Interim Primary Drinking Water Regulations were promulgated on December 24, 1975, to take effect June 24, 1977. These regulations set Maximum Contaminant Levels (MCL) for ten inorganic constituents, turbidity, coliform organisms, six pesticides and radionuclides. PL-93-523 stated that the Primary Drinking Water Regulations should consist of MCLs as well as a statement of treatment technology that could be used to achieve these levels. This document provides that information. It contains five sections as related to the five groups of Interim Primary Drinking Water Regulations noted above. This document, based on the literature and the research being conducted by the Water Supply Research Division, is not meant to stifle innovative treatment technology. It attempts to be a statement of technology known at the time of the effective date of the Interim Primary Drinking Water Regulations that will allow utilities, with assistance from their consulting engineers, to apply whatever treatment might be necessary to improve their drinking water quality such that it meets the Interim Primary Drinking Water Regulations.

PB-268 081/7 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
43 Rules: How Houses Can Better Resist High Wind
S. Kliment, N. Raufaste, and R. Marshall. May 77, 14p Rept no. NBSIR-77-1197
Grant PASA-TA(CE)-94-73

Keywords: Residential buildings, Wind(Meteorology), Design criteria, Construction materials, Construction joints, Fasteners, *Wind pressure, *Buildings, Wind resistant structures.

This guide presents to designers, builders, government and private building authorities, and building owners and occupants a series of effective methods for improving the resistance of new and existing buildings against high winds. The methods described may be applied to improving the construction of new buildings as well as to increase the wind resistance of existing buildings. This material offers guidelines for selecting the location and orientation of buildings and the building shapes, for suggesting methods of construction, for recommended building details, and for local production of connectors and fasteners. It covers two common types of construction - masonry and timber - as well as selected details, based on local materials such as bamboo and adobe.

PB-268 124/5 PC **A07**/MF **A01**
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Leucaena: New Forage and Tree Crop for the Tropics
Final rept.
Jul 77, 126p* Rept no. CIR/BOSTID-77/24
Contract AID/csd-2584
Prepared in cooperation with Philippine Council for Agriculture and Resources Research, College. Text in English, Resume in French and Spanish.

Keywords: Leguminous plants, Tropical regions, Developing countries, Forage crops, Wood products, Structural timber, Wood pulp, Feeding stuffs, Trees(Plants), Erosion control, Vegetation, Esthetics, *Crops, *Wood, *Pulp, *Plants (Botany), Leucaena leucocephala.

The report describes Leucaena leucocephala, a little-known Mexican plant with bushy and tree-type varieties that produce nutritious forage, firewood, timber, paper pulp, and organic fertilizer. Its diverse uses also include revegetating hillslopes and providing firebreaks, shade, and city beautification.

PB-268 161/7 PC **A06**/MF **A01**
George Washington Univ., Washington DC. Graduate Program in Science, Technology, and Public Policy.
IRRI Small Agricultural Machinery Project: US Technology Transfer to Resource-Poor Developing Countries
Final rept.
Ann Becker, and Carol A. Ulinski. Dec 75, 103p
NSF/PRA-19893/3/7
Contract NSF-STP74-19893
Continuation of Grant NSF-ST-44205. See also PB-268 001 and PB-268 002.

Keywords: *Agricultural machinery, Developing countries, Technology transfer, Projects, Research, Development, Fabrication, Utilization, Farms, Government policies, Philippines, Performance evaluation, Foreign aid.

This study focuses on the results of the IRRI Small-Scale Agricultural Machinery Project in the Philippines, supported initially by the US Agency for International Development (AID). It examines three main stages of activity: research and development, manufacturing, and adoption of machinery by the farmers. It also studies Philippine Government policies in the light of the Project's objectives and mechanisms to facilitate linkages between each of the stages. The study assesses the success of the Project in terms of the amount of indigenization of problem-solving capabilities which has been achieved to date.

PB-268 185/6 PC **A05**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Employment, Efficiency and Income in the Rice Processing Industry of Sierra Leone
African rural economy paper
Dunstan S. C. Spencer, Ibi I. May-Parker, and Frank S. Rose. 1976, 92p Rept no. AREP-15
Prepared in cooperation with Njala Univ. Coll. (Sierra Leone). Dept. of Agricultural Economics and Extension.

Keywords: *Rice, Food processing, Economic development, Developing countries, *Sierra Leone, Policies, Flour mills, Manpower utilization, Capitalized costs, *Employment, Income, Prices, Input, Output, Operating costs, Transportation, Mathematical models, Tables(Data), North Africa.

In West Africa the rice processing technologies range from traditional hand pounding to large mechanical mills. Because these technologies have varying factor intensities and output efficiencies the choice of technology in any country will have important effects on factor utilization, particularly employment, and on output. In Sierra Leone the government is currently

considering whether investment should be directed to rehabilitation of three existing large mills, purchase of new large mills or encouragement of private investment in small mills including the location of these mills. The specific objectives of this study are: To describe and analyze the traditional and modern techniques of processing rice in Sierra Leone; and to develop a methodology to analyze the employment and income effects of policies.

PB-268 493/4 PC A07/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
The Economics of Rural and Urban Small-Scale Industries in Sierra Leone
African rural economy paper
Carl Liedholm, and Enyinna Chuta. 1976, 142p Rept no. AREP-14
Prepared in cooperation with Njala Univ. Coll. (Sierra Leone). Dept. of Agricultural Economics and Extension.

Keywords: Economic development, Developing countries, Industries, *Sierra Leone, Economic surveys, Rural areas, Urban areas, Policies, Factor analysis, Output, Employment, Data acquisition, Economic analysis, *Small businesses, *Industrial development.

This report summarizes and describes the major findings and conclusions of our research on small industry in Sierra Leone. The primary objectives of the research were to provide a descriptive profile of small-scale in Sierra Leone, to analyze the key determinants of the demand for and supply of output and employment generated by these industries, and to examine the efficacy of the major policies influencing small-scale industries. The problem setting discussed, followed by an examination of the most important empirical and analytical issues relating to small-scale industries. One section examines the major policy implications of the research.

PB-268 710/1 PC A05/MF A01
Iowa State Univ., Ames. Engineering Research Inst.
Enzyme Technology in the Utilization of Agricultural Wastes
Final rept.
Peter J. Reilly. Mar 77, 90p ISU-ERI-AMES-77312, NSF/RA-770079
Grant NSF-APR74-20111

Keywords: *Agricultural wastes, *Plants(Botany), Hemicellulose, *Enzymes, Foods, Industrial plants, Nutritive value, Cellulose, Lignin, Xylose, Sugars, Extraction, Hydrolysis, Substrates, Ion exchanging, Purification, pH, Stability, Separation, Enzyme technology, Xylans, Xylitol, Xylosidases.

Hemicellulose is a major fraction of cellulosic material. In hardwoods and cereals, one of its major components, xylan, can take up to 30% of the total dry weight. Xylan can be hydrolyzed either enzymatically or by acid to form xylose, which can be fermented to form single cell protein or other products or hydrogenerated to the potent sweetener xylitol. In this report the separation of the enzymes that hydrolyze larchwood and corn cob xylan is detailed. The system is surprisingly complex, with more than ten enzymes taking part in the breakdown. Beta-Xylosidase, the enzyme that catalyzes the last step, the production of xylose from short xylooligosaccharides, has been extensively purified and characterized. It is quite stable at temperatures up to 70C at pH 4.

PB-268 718/4 PC A19/MF A01
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
Wind Energy Conversion
Final rept. Feb 75-Oct 76
R. H. Miller, M. Martinez-Sanchez, J. Dugundji, E. E. Larrabee, and I. Chopra. Oct 76, 431p ASRL-TR-184-3, ERDA/NSF-00826/75-3
Grant NSF/AER75-00826
See also Report dated 15 Feb 76, PB-256 198.

Keywords: Wind power generations, *Turbines, Windmills, Aeroelasticity, Aerodynamic forces, Wind shear, Dynamic response, Wind tunnel models, *Wind energy.

An investigation is made of various problems associated with the design of horizontal axis, low solidity, high performance wind turbines. The report deals with the following topics: (a) Wind turbine performance as determined from various elementary and more refined momentum theories; (b) Performance trade-offs between constant RPM and constant velocity ratio operation; (c) Aerodynamic vortex theories for blade loadings including unsteady effects and wind shear velocity gradients; (d) Control dynamics of a synchronous alternator-wind turbine system; (e) Linear aeroelastic stability studies of rotor blades in the presence of moderate initial coning angles; (f) Nonlinear dynamic response of rotor blades including gravity and wind shear excitation; (g) An experimental investigation of a .914 m (3 ft) diameter, 2 bladed wind turbine placed in a wind tunnel.

PB-268 810/9 PC A14/MF A01
Colorado Univ., Boulder. Dept. of Civil and Environmental Engineering.
Segregation and Reclamation of Household Wastewater at an Individual Residence
Master's thesis
Craig Carroll Withee. 1975, 309p OWRT-A-021-COLO(4)
Contract DI-14-31-0001-5006, Grant EPA-T-900116

Keywords: Sewage disposal, *Sewage treatment, *Waste water rouse, Rural areas, Mountains, Residential buildings, Activated carbon treatment, Decomposition, Anaerobic processes, Aerobic processes, Water pollution abatement, Filtration, Biochemical oxygen demand, Separation, Detergents, Toilet facilities, Efficiency, Field tests, Theses, Colorado, Household wastes.

Disposal of wastewater from isolated homes in mountainous and rural locations in Colorado presents unique and difficult problems. The purpose of the study was to evaluate the flow and pollution patterns from individual homes and to evaluate existing and potential treatment methods. Field evaluation of home wastewater flow and pollutional characteristics was accomplished. The average per capita water use in the home was 44.4 gallons per day and the waste strength was 0.11 pounds per capita per day of BOD. Data for individual fixtures and appliances were obtained with measurement of many pollutional parameters. A brief evaluation of the home treatment methods was accomplished. Laboratory bench scale studies were made to evaluate methods for treatment of the soap related wastes in the home for reuse as toilet flushing water.

PB-268 820/8 PC A03/MF A01
Colorado State Univ., Fort Collins. Environmental Resources Center.
Soil and Rock Strata to Trap, Filter, and Store Water for Rural Domestic Use
Technical completion rept.
Arthur T. Corey, and George L. Smith. Dec 76, 46p OWRT-C-6176(5219)(1)
Contract DI-14-31-0001-5219

Keywords: Ground water recharge, *Water supply, *Arid land, Aquifers, Rainfall, Runoff, Construction, Water storage, Potable water, Earth dams, Soils, Gravel, Dikes, Filtration, Terrain, American Indians, New Mexico, South Dakota, *Ground water, Artificial recharge.

Experimental rock and soil strata for collection, filtration and storage of rainfall and runoff water were constructed on three separate Indian Reservations: Ramah Navajo, Santa Clara Pueblo in New Mexico, and the Pine Ridge (Oglala Sioux) in South Dakota. The artificial spring strata were constructed to determine their potential in the development and use of Indian and other lands located in the arid and semi-arid sections of the country where the availability of adequate water supplies for domestic use, for watering livestock in otherwise suitable grazing areas, and for the production of food crops is either severely limited as surface water, or the groundwater is non-existent, excessively saline, or at very great depths. The principle objective was to provide a reliable source of potable water at a relatively low cost. The most important factors in the construction of the experimental strata were site location, techniques of construction of the facility, selection of strata material and method of placement of impermeable layer.

PB-268 986/7 PC A03/MF A01
ACTION/Peace Corps, Washington, DC. Office of Multilateral and Special Programs.
Utilization and Construction of Pit Silos
Program and training journal reprint series.
Mar 77, 47p Rept no. Reprint Ser-15a

Keywords: Silage, Forage crops, Silos, Farm crops, Harvesting, Preservatives, Corn plants, Grain sorghum plants, Grasses, Fermentation, Storage, Drying, Construction, *Food storage.

Contents: Ensilage hay and pasture crops; Harvesting silage crops; Handy silage preservative guide; Characteristics of high quality hay; Storage of forage; Corn or sorghum silage vs. grass silage; Pit silos; Project ensilage. (Portions of this document are not fully legible.)

PB-268 987/5 PC A05/MF A01
ACTION/Peace Corps, Washington, DC. Office of Multilateral and Special Programs.
Freshwater Fisheries: Program Planning
Program and training Journal manual series
Steven Gregory. Mar 77, 79p Rept no. Manual Ser-1A

Keywords: Aquaculture, Fresh water fishes, Developing countries, Instructional materials, Feasibility, Project planning, *Fisheries, Personnel development, Job analysis, Ponds, Site surveys, Breeding, Growth, Maintenance, Recommendations, Manuals, Zaire Republic.

The report is designed for policy-makers, program planners, trainers, and coordinators who are considering the potential contribution of fresh water fisheries to the people for and with whom they work. It describes in detail intensive fish culture in warm fresh water bodies, particularly artificially constructed fishponds. It is based on Peace Corps experiences, but applicable to a wider audience.

PB-268 988/3 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Office of Multilateral and Special Programs.
Conseils de Sante' a la Famille Africaine (Health Advice for the African Family)
Program and training journal reprint series.
Mar 77, 123p Rept no. Reprint Ser-21
Text in French.

Keywords: *Health education, Developing countries, Instructional materials, Manuals, Pregnancy, Nutrition, Birth, Foreign countries, *Africa, Peace Corps, Infant health care.

The illustrated manual in simple French, provides materials for teaching about pregnancy and childbirth, infant nutrition and basic health precautions, and recipes for infants' meals.

PB-269 049/3 PC A05/MF A01
ACTION/Peace Corps, Washington, DC.
Contabilidad para la Micro Empresa: Manual de Ensenanza (Accounting for the Small Business: Teaching Manual)
Program and training journal reprint series
Michael W. Ronan. Apr 77, 90p Rept no. Reprint Ser-23
Text in Spanish.

Keywords: Accounting, Manuals, Businesses, Spanish language, Instructional materials, Developing countries, *Management techniques, Small businesses.

A teaching manual for small business accounting is prepared in Spanish text by a Peace Corps Volunteer in Colombia.

PB-269 519/5 PC A05/MF A01
National Academy of Sciences, Washington, DC.
Drinking Water and Health
Summary rept.
1977, 100p*
Contract EPA-68-01-3169

Keywords: Potable water, Public health, Assessments, Reviews, Recommendations, Law(Jurisprudence), Legislation, Humans, United States, Contaminants, Microorganisms, Radioactive isotopes, Solutes, Health risks, Toxicity, Epidemiology, Laboratory animals, Experimental data, *Water quality, *Health, Environmental health, Safe Drinking Water Act of 1974, Public Law

93-523, Particulates, Appendices, Water pollution effects(Humans).

The Safe Drinking Water Act of 1974 (PL93-523) required the Administrator of the Environmental Protection Agency to arragne for a study that would serve as a scientific basis for revising the primary drinking water regulations that were promulgated under the Act. The Study was conducted by the Safe Drinking Water Committee of the National Research Council. A thorough study of the scientific literature was undertaken in order to assess the implications for human health of the constituents of drinking water in the United States. Assessment of the health benefits and the economic or technological feasibility of achieving a given level of contaminant control is outside the scope of the study, although the beneficial effects of some constituents of drinking water were considered. The risk to man of contaminants ingested in drinking water was evaluated on the basis of both epidemiological studies and studies of toxicity in laboratory animals.

PB-269 689/6 PC A04/MF A01
Sir J. J. Group of Hospitals, Bombay (India). Tata Dept. of Plastic Surgery.
A Comprehensive Rehabilitation Research and Demonstration Programme for Patients in an Urban Population
Final rept.
1975, 71p SRS-19-58139-001
Grant SRS-19-58139

Keywords: *Rehabilitation, Leprosy, Attitudes, Urban areas, Surgery, Social psychology, *Vocational guidance, *India, Developing countries.

A comprehensive research and demonstration project was undertaken in Bombay, India, to study the problems of the rehabilitation of lepers from the social, psychological, medical, and economic points of view. Psycho-social studies were conducted with the aim of reducing the stigma of leprosy. Medical studies developed and evaluated new techniques of dealing with the physical problems of lepers' hands and feet. Lepers were directly prepared for job training, and industrialists came to better understand the problems of the handicapped in conferences with rehabilitation and medical professionals.

PB-269 892/6 PC A04/MF A01
General Accounting Office, Washington, DC. International Div.
Restrictions on Using More Fertilizer for Food Crops in Developing Countries: Department of State and Other Federal Agencies
Report to the Congress.
5 Jul 77, 73p Rept no. ID-77-6

Keywords: Farm crops, *Fertilizers, Developing countries, Production, Utilization, Food supply, Government policies, Technical assistance, Prices, Financing, Grants, Recommendations, Tables(Data), *Crops.

This report is part of a continuing effort to recommend ways U.S. agencies can better help developing countries to improve their food situation. The report discusses the need for governments receiving foreign economic assistance to revise policies which act as constraints to increasing the use of fertilizer for food crops.

PB-270 038/3 PC A06/MF A01
American Public Health Association, Washington, DC. International Health Programs.
The State of the Art of Delivering Low Cost Health Services in Developing Countries: A Summary Study of 180 Health Projects
Jan 77, 118p
Contract AID/csd-3423, AID/ta-c-1320

Keywords: Developing countries, *Health care delivery, Innovations, Populations, Medical services, Reviews, Health care services, Foreign countries, Health care costs, Projects, *Health manpower, Manpower utilization, Health education, Family planning, Nutrition, Health care facilities, Evaluation, Management, Promoting, Tables(Data), Maternal and child health services, Appendices.

Contents:
- Project characteristics, activities and obstacles;
- Health manpower training and utilization;
- The delivery of health services;
- The promotion of health--education, organizations and the environment;
- Project planning and management;
- Evaluation;
- Innovations in the delivery of low-cost health services.

PB-270 076/3 PC A04/MF A01
Economic Research Service, Washington, DC.
A Guide to Energy Savings for the Dairy Farmer
Jun 77, 55p* FEA/D-77/265
Contract FEA-CO-04-50057-01

Keywords: *Energy conservation, Farm management, *Dairies, Farms, Dairy buildings, Hot water heating, Space heating, Ventilation, Dairy equipment, Milk coolers, Vacuum pumps, Electric motors, Illuminating, Tractors, Trucks, Energy consumption, Fuel consumption, Electric power demand, Cost effectiveness, Benefit cost analysis, Guidelines, Recommendationsm *Milk, Electric power consumption.

This guidebook contains a wide spectrum of ideas for operators of many sizes and types of dairy farms. The ideas range from greater attention to daily details to substantial added investments in facilities and equipment.

PB-270 401/3 PC A05/MF A01
Transportation Systems Center, Cambridge, Mass.
Methanol as an Automotive Fuel with Special Emphasis on Methanol-Gasoline Blends
Final rept. Jun-Oct 74
A. Landman. Apr 77, 89p* Rept nos. DOT-TSC-OST-74-38, DOT-TSC-OST-77-31

Keywords: *Methanol, *Automotive fuels, Blends, Gasoline, Physical properties, Chemical properties, Forecasting, Comparisons, Automobile engines, Manufacturing, Air pollution, Exhaust emissions, Toxicity, Materials handling, Storage, Utilization, *Fuels, *Energy conservation, Fuel economy.

This report reviews the available information on methanol as related to its potential use as an automotive fuel. Information gaps critical to assessment and future decisions are delineated and suggestions made for necessary R&D efforts. In this context, methanol is characterized and the results of various studies on methanol and methanol-gasoline blends, throughout the United States and elsewhere, are presented and compared. These studies encompass fuels and their use and effects in engines and vehicles. Cost information, although limited, is given as available. The report also describes and summarizes methanol production processes, their promise and expansion possibilities in relation to potential requirements. Various raw material sources are considered in the light of future production potential needs.

PB-270 413-T PC A06/MF A01
Agricultural Research Service, Washington, DC.
Physiology of Milk Secretion in Machine Milking
I. G. Velitok. 1977, 109p Rept no. TT-75-52055
Trans. of mono. Fiziologiya Molokootdachi pri Mashinnom Doenii, Kiev, 1974, by R. S. Chakravarthy. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Dairy cattle, Animal physiology, *Animal husbandry, *Milk, Mammary gland, Yield, Animal diseases, Animal nutrition, Books, Translations, *USSR, Secretion, *Dairies, *Agricultural machinery, Milking, Milking machines, Lactation.

This book briefly records new data on machine milking gathered by the author and his associates over the last 15 years. It discusses the results of research in the Soviet Union and abroad on the physiology of milk secretion in machine milking of cows. Questions pertaining to the physiology of milk secretion are examined in relation to the technological requirements of mechanized dairy farms. The physiological basis of rational exploitation of cows and problems of the technology and organization of machine milking are treated in the light of recent studies in the physiology of lactation. The book is recommended for zootechnicians, veterinarians, physiologists and other specialists in animal husbandry.

PB-270 607/5 PC A04/MF A01
Hawaii Univ., Honolulu.
Report of the Workshop on Experimental Designs for Predicting Crop Productivity with Environmental and Economic Inputs Held at Honolulu, Hawaii on May 20-24, 1974
J. A. Silva, and F. H. Beinroth. May 74, 58p
Sponsored in part by Agency for International Development, Washington, D.C. Prepared in cooperation with Puerto Rico Univ., Mayaguez.

Keywords: Farm crops, Tropical regions, Developing countries, Production, Yield, Soil properties, Fertilizers, Irrigation, Experimental design, Research projects, Universities, Research management, *Environmental impacts, *Crops.

The Universities of Hawaii and Puerto Rico have formulated two projects with the assistance of United States, Agency for International Development (USAID) to undertake some of the necessary research and to design an extension delivery and communications system that will hasten the application of tropical agricultural research. The purposes of the projects are to correlate food crop yields on a network of benchmark soils, and to determine scientifically the transferability of agro-production technology among tropical countries. The workshop, which is the basis of the report, was held to discuss and hopefully to agree upon the experimental designs and research methodology that would be used in the crop production research in these two projects.

PB-270 775/0 PC A04/MF A01
Missouri Univ.-Rolla. Dept. of Civil Engineering.
Control of Algae in Lakes, Lagoons and Small Reservoirs with Biogrowth Partitions
Completion rept. Jul 74-Jun 76
Bobby G. Wixson, Donald E. Modesitt, Paul Han Cheng, and Walter H. Zachritz. Jun 77, 60p OWRT-A-077-MO(2)
Contract DI-14-31-0001-5025, DI-14-31-0001-6026

Keywords: *Algae, Pest control, *Lakes, Reservoirs, *Sewage treatment, Lagoons(Ponds), Growth, Waste water, Oxygen, Dissolved gases, Carbon dioxide, Tanks(Containers), Effectiveness, Design, Biochemical oxygen demand, Field tests, Biogrowth partitions, Eutrophication.

Research was carried out on the control of algae from small lagoons through laboratory and field studies of manmade biogrowth surfaces for removing or controlling algae. Three lab-scale stabilization lagoons were modified with the addition of biogrowth sheets and operated with 30-day and 15-day detention periods. Principal parameters measured were COD, suspended solids, dissolved oxygen, pH, carbon dioxide, and microbial populations. Experimental laboratory results indicated that the application of biogrowth sheets was effective for lagoon stabilization. The practicability and design characteristics of the lagoon modification were then evaluated in field investigations.

PB-270 854/3 PC A04/MF A01
National Bureau of Standards, Washington, D.C. Materials and Composites Section.
Survey of Uses of Waste Materials in Construction in the United States
James R. Clifton, Paul W. Brown, and Geoffrey Frohndorff. Jul 77, 64p Rept no. NBSIR-77-1244
Contribution to the RILEM Symposium by Correspondence on the Uso of Waste Materials in the Construction Industry.

Keywords: Construction materials, *Industrial wastes, Reclamation, Solid waste disposal, Fly ash, Slags, Refuse disposal, Rocks, Spoil, Phosphate deposits, Aluminum industry, Cements, Calcium sulfates, Sludge disposal, Combustion products, By-products, Slimes, Demolition, *Building materials, *Waste recycling, Mine wastes, Dredge spoil, Cement industry, Phosphate industry, Limestone scrubbing, Red mud.

This survey covers the sources, amounts and disposal of major mining, industrial and municipal wastes available in the 48 conterminous states of the United States along with their present and potential uses as construction materials. In this report wastes from mining, industrial and municipal sources are treated separately and in that order. This is the order of decreasing amount of usable wastes available from each major

classification. Wastes from mineral, metallic ore and coal mining operations are covered in Section 2. Industrial wastes are treated in Sections 3 to 5, with Section 3 describing a variety of important wastes which have found few markets; by-products from coal combustion, which are examples of wastes for which there are growing markets, are discussed in Section 4; and Section 5 covers slags, by-products which are already extensively used as aggregates in construction but for which there may be higher value uses. Municipal wastes, including municipal refuse, incinerator residue, glass, demolition waste and sewage sludge, are the subject of Section 6. Then Section 7 is directed towards some potential wastes which may be generated in substantial amounts by emerging technologies related to energy production and environmental protection. Obstacles to and incentives for the increased use of waste materials in construction are discussed in Section 8.

PB-271 002/8 PC A08/MF A01
Missouri Agricultural Experiment Station, Columbia.
The Agricultural Development of Nicaragua: An Analysis of the Production Sector
Special rept.
Philip F. Warnken. Jul 75, 172p Rept nos. SR-168, International Ser-1

Keywords: *Agricultural economics, Developing countries, *Nicaragua, Farms, Production, Trends, Land use, Manpower, Cost analysis, Farm crops, Income, Livestock, Market value, Fertilizers, Agricultural machinery, Statistical data.

This study presents a benchmark descriptive analysis of agricultural production in Nicaragua. The purpose was to provide an analytical basis whereby priorities for general and specific agricultural policies could be established to further Nicaraguan developmental objectives in the agricultural sector. The study was limited to an analysis of principal agricultural products in Nicaragua and included nine crops and two livestock activities. These activities were grouped into three classes of products: (1) basic grains including corn, beans, rice and grain sorghum; (2) export products including cotton, coffee, surgarcane, tobacco and sesame; and (3) livestock activities which included the beef and dairy enterprises. Together, these activities accounted for over 90 percent of the total value of production from the agricultural sector in 1971. The analysis was further limited to production from the six major regions which lie in the western half of the country. The two eastern regions bordering the Caribbean were excluded from the study since both are economically unimportant in terms of national agricultural output.

PB-271 376/6 PC A03/MF A01
ACTION/Peace Corps, Washington, DC.
Strings 'N' Things, A Teaching Manual for the Blind
Program and training journal reprint series
Grace Munns. 26 Aug 77, 39p Rept no. Reprint Ser-24

Keywords: Instructors, Specialized training, Blindness, Manuals, Adults, *Rehabilitation, *Vocational guidance, Abilities, Manual abilities, Blind persons, Handicrafts.

This manual is intended to help those with little or no craft experience in working with the blind. The projects illustrated here have been used in a rehabilitation program oriented toward manual dexterity for blind adults. The program begins with simple Macrame projects and progresses to more complicated ones that demand a higher degree of skill and ability.

PB-271 392/3 PC A03/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.
Pyrolytic Conversion of Agricultural and Forestry Wastes in Ghana - A Feasibility Study
Jul 76, 47p
Contract AID/ta-C-1290
Prepared in cooperation with Council for Scientific and Industrial Research, Kumasi (Ghana). Building and Road Research Inst., and Technology Consultancy Center, Kumasi (Ghana).

Keywords: *Agricultural wastes, *Wood wastes, *Pyrolysis, *Fuels, *Ghana, Reclamation, Solid waste disposal, Charcoal, Manufactured gas, Fuel oil, Design, Combustion chambers, Cost estimates, *Waste recycling, Appropriate technology.

This report describes the results of a field study to determine the quantities and characteristics of waste in Ghana and the feasibility of using pyrolytic conversion of these wastes. The study shows that Ghana is generating 2,735,100 tons of agricultural and forestry waste materials each year that are suitable for pyrolytic conversion. Using pyrolytic conversion of all these waste materials, approximately 342,000 tons of charcoal and perhaps 273,000 tons of oil could be produced. The market value of the end products would be about $48,396,000 each year. A preliminary description of an appropriate technology version of a continuous/batch pyrolytic conversion system is also presented in this report.

PB-271 709/8 PC A02/MF A01
Florida Dept. of Natural Resources, Tallahassee.
Mass Culture of Freshwater Prawns for Commercial Evaluation
Completion rept. 1 Jul 75-31 Dec 76
Scott A. Willis. Jul 77, 13p NOAA-77072535

Keywords: Shellfish, Aquaculture, Animal nutrition, Feeding stuffs, Weight(Mass), Cost analysis, Fresh water fishes, Survival, Florida, *Fishes, Macrobrachium rosenbergii.

Post larval Macrobrachium rosenbergii were fed various amounts of Purina trout chow to determine optimal feeding requirements during nursery development. During the four week study, best results were found in treatments fed amounts of food which decreased weekly as the food demand of the prawns decreased. The two treatment replicates fed 10, 7 1/2, 5, and 2 1/2% body weight daily during each week had increases from 0.03 g to 0.35 g and 0.26 g mean prawn weight, 100 and 98.7% survival, and food conversion ratios of 1.2 and 1.8:1. This refinement in determination of prawn food needs would allow 10,000 post larvae to be reared for four weeks in a nursery situation for a food cost of $1.80.

PB-271 710/6 PC A04/MF A01
Florida Dept. of Natural Resources, St. Petersburg. Marine Research Lab.
Growout of the Giant Malaysian Prawn, Macrobrachium rosenbergii, in Earthen Ponds in Central Florida
Completion rept. May-Nov 76
Scott A. Willis, and Mark E. Gerrigan. 1977, 54p NOAA-77072536

Keywords: Shellfish, Aquaculture, Growth, Weight(Mass), Feeding stuffs, Survival, Fresh water fishes, Harvesting, Management, Ponds, Florida, *Fishes, Macrobrachium rosenbergii, Predators.

Postlarval and juvenile Macrobrachium rosenbergii were stocked in twelve 0.025 ha earthen ponds to study the effects of stocking size and density on growth and survival. Following each four week sampling interval, feeding rates were adjusted based on mean body weight and an estimated 5% mortality. Management practices employed to enhance production levels included complete analysis of water quality parameters, use of fertilizer to sustain planktonic blooms, mechanical and chemical water weed control, and identification of predators. All prawns were sexed at harvest and length-weight relationships were determined for both male and female prawns.

PB-271 714/8 PC A04/MF A01
Tennessee State Univ., Nashville.
A Complete Disposal-Recycle Scheme for Agricultural Solid Wastes
Final rept. Jan 74-Jun 76
Michael R. Busby, Greg Tragitt, Roland Norman, and Kenneth Hillsman. May 77, 62p EPA/600/2-77/089
Contract EPA-R-802739

Keywords: Solid waste disposal, *Agricultural wastes, Anaerobic processes, Reclamation, *Methane, Fuels, Fertilizers, Feeding stuffs, Sludge disposal, Animal nutrition, Chemical analysis, Sampling, Process charting, Performance evaluation, *Bioconversion, *Manures, *Waste recycling.

This investigation applied the anaerobic process to the production of methane gas and a stabilized sludge from cow manure and farm clippings in laboratory pilot plants as well as a full-scale (2,000 gal.) digester system. The quantity and quality of gas produced, the biochemical and chemical oxygen demands, and the nutritional value of the digested sludge for both the laboratory and full-scale plants were evaluated.

PB-271 901-T PC A20/MF A01
Department of Agriculture, Washington, DC.
Selection, Seed Culture and Some Agrotechnical Problems of Sunflower
V. S. Pustovoit. 1976, 474p Rept no. TT-70-57248
Contract NSF-C466
Trans. of mono. Selektisiya, Semenovodstvo i Nekotore Voprosy Agrotekhniki Podsolnechnika, Moscow, 1966. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Oilseed crops, Growth, Cultivation, Plant genetics, Yield, Selection, Germination, Viability, Plant diseases, Vegetable oils, Hybridization, Seeds, Translations, *USSR, Sunflowers.

Partial contents:
- A brief survey of researches on oleaginous sunflower during 1912-1925;
- Sunflower breeding for raising oil percentage of seeds;
- Development of breeding methods and sunflower seed farming;
- New sunflower varieties and methods of seed farming;
- Sunflower and peculiarities of its cultivation;
- Breeding of sunflower varieties immune to the main diseases and pests;
- For increasing the production of sunflower oil;
- Research results on sunflower breeding and seed farming during 1912-1961;
- Sunflower--the crop of great economic potential.

PB-272 005/0 PC A05/MF A01
General Accounting Office, Washington, DC. Community and Economic Development Div.
Food Waste: An Opportunity to Improve Resource Use: Department of Agriculture
Report to the Congress.
16 Sep 77, 84p* Rept no. CED-77-118

Keywords: Food, Wastes, Resources, Food consumption, *Food supply, Production capacity, Food industry, Management, Consumer affairs, Food wasting, Department of Agriculture.

The report discusses the Department of Agriculture's past and current activities concerning food loss in the United States, as well as a broader assessment of loss. Study results indicate that about one-fifth of all food produced for human consumption is lost annually in the United States. In the world context of rising population, uncertain weather, and concern with the availability of resources, every opportunity should be taken to improve food system management in this country. More attention should be directed at the causes of food waste, new management technology for reducing loss, and improvement of consumer understanding.

PB-272 129/8 PC A06/MF A01
Boise Center for Urban Research, Idaho.
Analysis of Alternatives to Refuse Disposal
Final rept.
Jim Baker, Mike Bowlin, Carol Hansberger, and Phil Hanson. May 77, 104p UO-LCCM-BOI-77-009, HUD/RES-1140
Prepared in cooperation with League of Cities-Conference of Mayors, Inc., Washington, D.C., Contract HUD-H-2196R.

Keywords: Solid waste disposal, Management planning, Garbage, Sanitary landfills, Reclamation, Materials recovery, *Land use, Refuse disposal, Marketing, Separation, Site surveys, Paper, Metals, Iron, Aluminum, Wood wastes, Plastics, Leather, Incinerators, Biodeterioration, Fuels, Water pollution control, Government policies, Regulations, Geology, Demography, Cost analysis, Financing, Idaho, *Waste disposal, Ada County(Idaho), Waste recycling, Pyrolysis incineration, Refuse derived fuels, Source separation.

The researchers reviewed six alternative solid waste methods. The six alternatives considered were: continued landfill; household or source separation; pyrolysis; biodegradation; waste-based solid fuel production; incineration. The use of a sanitary landfill is virtually unavoidable now and in the near future. Whatever plan or alternative is adopted for Ada County, a certain percentage of waste or amount of residue will ultimately end up in a landfill. It is at the present, the most practical, least-cost method of disposing of garbage. However, the sanitary landfill is not without problems. For instance, the Hidden Hollow Sanitary Landfill, Ada County's primary landfill site, opened in 1971 and was expected to last up to 1986. However, due to an increasing volume of garbage, the life expectancy has been shortened and the closing date is now estimated to be about 1980. As citizens become familar with more sanitary and productive methods of disposing and/or utilizing solid waste, traditional landfill techniques will become less acceptable. Also, as the cost of energy escalates, landfill will not be cost effective compared to processes that recover materials or energy from solid waste. (Portions of this document are not fully legible)

PB-272 436/7 PC **A03**/MF **A01**
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Impact of Hail Suppression on Nebraska Crop Production: A Simulation Study
Final rept. for 1971
Larry M. Boone. Sep 77, 46p Rept no. AGERS-39
Grant NSF-AG-275

Keywords: *Hail, Weather modification, Farm crops, Nebraska, Production, Cost analysis, Marketing, Prices, Demand(Economics), Tables(Data), Linear programming, Computerized simulation, *Crops.

A linear programming analysis was used to simulate effects of hail suppression on Nebraska crop production. Production costs and crop patterns in ten major land resource areas (LRAs) were estimated for 10%, 25%, and 50% levels of hail suppression effectiveness, and compared to costs and production distribution patterns without hail suppression. With hail suppression effectiveness of 50%, total production costs in the state would have increased less than 1/2%. Corn production would have been 2% higher; wheat production, 3.7% higher. With hail suppression, production shifts of the same crop between LRAs were less than 2%. Hail suppression would not have caused substantial shifts of land use from one crop to another within an LRA. If hail suppression technology were widely used it could influence production of some crops enough to change price.

PB-272 651/1 PC **A06**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Agriculture and Life Sciences.
Evaluation of Investment Opportunities: Tools for Decisionmaking in Farming and Other Businesses
Final rept.
Arthur J. Walrath. Jun 77, 108p* Rept no. AH-349
Sponsored in part by Economic Research Service, Washington, D.C. Economic Development Div.

Keywords: Farm management, Investments, Decision making, Return on investment, Costs, Fixed investment, Discounted cash flow, Savings, Profits, Computation, Tables(Data), *Agriculture, *Management techniques.

This report offers business managers, including farmers, easy-to-use guides for analyzing investment opportunities. Examples show how to classify and compare various costs and returns. Formulas are given which can be applied to business decisions. They emphasize the time-value concept of money by using compounding and discounting methods. Tables are presented for determining the future value of a present sum, present value of a present sum, and present and future values of annuities. Although aimed at the businessman, the handbook can also be used to make household decisions: one example shows how much has to be saved each month to reach a savings goal in five years.

PB-272 681/8 PC **A20**/MF **A01**
Industrial Environmental Research Lab.-Cincinnati, Corvallis, Oreg. Food and Wood Products Branch.
Proceedings of National Symposium on Food Processing Wastes (8th) held on March 30 - April 1, 1977 in Seattle, Washington
Aug 77, 463p* Rept no. EPA/600/2-77/184

Keywords: *Food processing, Meetings, Water pollution control, Filtration, Brines, Revisions, Byproducts, Materials recovery, Industrial waste treatment, Guidelines, Canneries, Sludges, Anaerobic process, Standards, Odor control, Lagoons(Ponds), Assessments, Residues, Seafood, Tomatoes, *Fruits, *Vegetables, Feedstuffs, Proteins, Dairy, *Poultry, Preservatives, *Dairies, *Waste water reuse, *Water pollution, *Waste recycling, Water reuse, Meat packing industry, Biological industrial waste treatment.

The Proceedings contains copies of 29 of the 31 papers presented at the Eighth National Symposium on Food Processing Wastes. Subjects included: processing modifications, product and by-product recovery, wastewater treatment, water recycle and water reuse for several segments of the food processing industry. These segments included: red meat and poultry, seafood, dairy, fruit, and vegetable. Attendance at the two and one-half day Symposium was approximately 200 with good representation by industry, universities, consulting firms, as well as state and Federal agencies.

PB-272 702/2 PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, Okla.
Environmental Effects of Septic Tank Systems
Rept. for 1976-77
Marion R. Scalf, William J. Dunlap, and James F. Kreissl. Aug 77, 43p* Rept no. EPA/600/3-77/096

Keywords: *Septic tanks, *Sewage disposal, Water pollution abatement, Environmental impacts, Adsorption, Rural areas, Mountains, Ground water, Surface waters, Design, Regulations, Water pollution control, Sludge disposal, Leaching, Trends, Water wells, Oklahoma, Remote areas.

Septic tank-soil absorption systems are the most widely-used method of on-site domestic waste disposal. Almost one-third of the United States population depends on such systems. Although the percentage of newly constructed homes utilizing septic tanks is decreasing, the total number continues to increase. Properly designed, constructed, and operated septic tank systems have demonstrated an efficient and economical alternative to public sewer systems, particularly in rural and sparsely developed suburban areas. However, because of their widespread use in unsuitable situations, they have also demonstrated the potential for contamination of ground and surface waters.

PB-272 835/0 PC **A08**/MF **A01**
Illinois Univ. at Chicago Circle. Dept. of Materials Engineering.
Ferrocement in Bending, Part II: Fatigue Analysis
Final rept. 1974-77
P. Balaguru, A. E. Naaman, and S. P. Shah. Oct 77, 167 Rept no. 77-1
Grant NSF-ENG74-20829
See also report dated Aug 76, PB-262 155.

Keywords: *Concrete, Fatigue(Materials), Loads(Forces), Reinforcing materials, Rigidity, Cracks, Fatigue life, Creep properties, *Ferrocement.

This report follows Part I PB-262 155 which dealt with monotonic loading. In this report analytical and experimental investigations of ferrocement beam subjected to fatigue flexural loading are described. Based on experimental results, empirical formulae are suggested to predict fatigue life, and deflections and crack widths for a given number of cycles and loading. These formulae also seem to be applicable to conventionally reinforced concrete beams. In addition, based on the fatigue properties of the constituent materials: steel and concrete, a theoretical model was developed to predict behavior of ferrocement composited subjected to fatigue loading

PB-272 908/5 PC **A11**/MF **A01**
National Water Well Association, Worthington, Ohio.
Proceedings of the National Ground Water Quality Symposium (3rd) Held in Las Vegas, Nevada on September 15-17, 1976
Final rept. 31 Mar 76-31 Jan 77.
Jun 77, 240p* EPA/600/9-77/014
Contract EPA-68-03-2396

Keywords: *Ground water, *Water pollution, Meetings, Land use, Potable water, *Waste disposal, Subsurface drainage, Ground water recharge, Las Vegas Valley, Sewage disposal, Industrial wastes, Soil water, Ponds, Linings, Permeability, Seepage, Water table, Design criteria, Arid land, Nitrogen, Earth fills, Ground water movement, Artificial recharge, Sewage irrigation, Valdose zone.

The Third National Ground Water Quality Symposium was held in Las Vegas, September 15-17, 1976, in conjunction with the annual convention of the National Water Well Association. There were eight main sessions encompassing twenty-four technical papers. These were concerned with the disposal of waste on the land, the movement of pollutants in the subsurface, and artificial recharge. A special session was dedicated to ground water in the Las Vegas Valley.

PB-273 182/6 PC **A03**/MF **A01**
Office of Technology Assessment, Washington, DC.
Organizing and Financing Basic Research to Increase Food Production
Jun 77, 44p* Rept no. OTA-F-49
Library of Congress Catalog Card no. LCCCN-77-600025.

Keywords: *Food supply, Production, Research management, Photosynthesis, Nitrogen fixation, Plant genetics, Government policies, Grants.

The report analyzes alternatives in the organization and financing of basic research to increase food production. Alternative organizations of basic research are described and evaluated. The report discusses alternative levels of funding for basic research in the areas of photosynthesis, nitrogen fixation, and genetic engineering for plants. Alternative administrative structures for Federal support of basic research related to food production are suggested.

PB-273 264/2 PC **A06**/MF **A01**
Corvallis Environmental Research Lab., Oreg.
Biological Control of Aquatic Nuisances - A Review
Final rept.
Gerald S. Schuytema. Jul 77, 101p* Rept no. EPA/600/3-77/084

Keywords: Aquatic weeds, *Weed control, Reviews, Cyanophyta, Viruses, Fungi, Bacteria, Fishes, Snails, Phytoplankton, Zooplankton, Competition, Damage, Ecology, Algae, *Aquatic plant control, Biomanipulation, Biological insect control, Eutrophication, Water hyacinths, Alligator weeds, Agasicles, Neochetina, Predation, Tilapia.

A total of 532 references on the biological control of aquatic nuisances were reviewed. Three major control approaches exist. Grazing and predation have been the most frequently utilized techniques, with emphasis on macrophyte control by fish and insects. The use of pathogens is potentially effective, with most promise in macrophyte control. Biomanipulation, the exploitation of the interrelationships among plants and their environment is a most promising technique for eutrophic systems. This approach includes increasing algal grazers while controlling zooplanktivores and exploiting the competitive and growth limiting reactions among various species. The importance of using host-specific organisms to prevent damage to desirable components of the ecosystem is emphasized.

PB-273 270/9 PC **A99**/MF **A01**
National Highway Traffic Safety Administration, Washington, D.C. Technical Services Div.
Tires
Subject bibliography
Lois Flynn. Mar 77, 650p* Rept nos. SB-14, DOT-HS-802 148

Keywords: *Tires, Bibliographies, Automotive engineering, Abstracts, Traffic safety, Traction, Treads, *Traffic engineering, Motor vehicles, Dynamic structural analysis, Skid resistance, Braking, Trailers, Trucks, Suspension systems(Vehicles), Tire performance, Tire wear resistance, Bias tires, Belted bias tires, Wet road conditions, Tire tread patterns, Vehicle road interface, Radial tires, Tire treads, Tire tread wear, Studded tires, Tire grading.

The bibliography represents literature acquired since the establishment of the National Highway Traffic Safety Administration (NHTSA) in 1967, as related to the effect of tires on highway safety. It is comprised of NHTSA contract reports, reports of other organizations concerned with highway safety, and articles from periodicals in related fields. Citations follow the format used in the monthly abstract journal Highway Safety Literature and are indexed by a key-word-out-of-context (KWOC) listing, author, corporate author, contract number, and report number.

PB-273 286/5 PC A18/MF A01
H. H. Aerospace Design Co., Inc., Bedford, Mass.
Automobile Scrappage and Recycling Industry Study - Overview Report
Final rept. Jun-Dec 75
R. Kaiser, R. P. Wasson, and A. C. W. Daniels. Sep 77, 409p* DOT-TSC-OST-77-11
Contract DOT-TSC-1028

Keywords: *Automobiles, Solid waste disposal, Materials recovery, Economic analysis, Motor vehicles, Metal scrap, Plastics, Iron alloys, Government policies, Regulations, Waste processing, Legislation, Trends, Steels, Rubber industry, Tires, *Waste recycling, Junk car disposal, Metal recycling, Scrap recycling, Plastics recycling, Secondary materials industry, Tire recycling.

The principal factors which influence the recovery of materials from junked automobiles are reviewed and evaluated. These include the number and materials composition of the automobiles that are retired annually in the U.S.; the flow of junk automobiles into the commercial recovery cycle and problems associated with abandoned automobiles; operations of the auto wrecking industry where serviceable parts are salvaged; and the structure, operations and technology of the scrap industry which transforms automobile hulks into commercial grades of metal scrap. Since Federal laws and policies impact on the reclamation of materials from junked automobiles, a legal review of key legislation and policies is also included. Because of a strong demand for auto hulks by scrap processors, created by an increased market for ferrous scrap, the problem of an ever increasing accumulation of unprocessed deregistered automobiles has been stabilized. In 1974, the fractional recovery of metallic materials from the approximately ten million automobiles deregistered that year was higher than from other forms of obsolete scrap. The estimated value of the recovered materials was in excess of one billion dollars.

PB-273 529/8 PC A08/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
The Application of Technology in Developing Countries
Rept. for Aug-Dec 76
Robert L. Bulfin, Jr, and J. Richard Greenwell. 1977, 172p
Contract AID/ta-6-1111
Papers presented during an Interdisciplinary Programs Seminar Series, August-December 1976.

Keywords: *Technology transfer, Developing countries, Meetings, *Technology assessment, Food industry, *Water resources, *Agriculture, Engineering, Appropriate technology.

The chapters in this volume are based on papers delivered during a weekly seminar series at the University of Arizona between September and December, 1976. These seminar series were originally held under the auspices of the University's Natural Resources Program, an interdepartmental activity made possible by a 211(d) institutional grant to the University from the U.S. Agency for International Development; the seminars are now sponsored by the University's Office of Interdisciplinary Programs. The volume, like the original seminar series, represents the varying, and sometimes differing, views of specialists in such fields as industrial, civil, nuclear, agricultural, and systems engineering, physical geography, and cultural anthropology; these views also represent both the University of Arizona and other nationally-known institutions.

PB-273 553/8 PC A05/MF A01
General Accounting Office, Washington, D.C. International Div.
Coffee: Production and Marketing Systems
Report to the Congress.
28 Oct 77, 98p* Rept no. ID-77-54

Keywords: *Coffee, Production, *Marketing, Agreements, Foreign countries, Prices, Stabilization, Developing countries, Exports, Supply(Economics), Demand(Economics), Department of State, Market shares.

Coffee is produced in 53 countries and territories and is vital to the economies of many underdeveloped countries that produce it. In 1976 its export value was more than $8 billion, second in value only to petroleum in international commodity trade. The United States has joined the 1962, 1968, and 1976 International Coffee Agreements primarily to help stabilize prices and export income of the developing producing countries. Fluctuations in the price of exported coffee appear to be in response to anticipated future availability. However, the policies and procedures of exporting countries can influence availability and create pressure on prices.

PB-273 572/8 PC A07/MF A01
General Accounting Office, Washington, DC. International Div.
The Challenge of Meeting Shelter Needs in Less Developed Countries
Report to the Congress.
4 Nov 77, 135p Rept no. ID-77-39

Keywords: Developing countries, *Housing, Residential buildings, Housing deficiencies, Financial support, Loans, Disadvantaged groups, Low income groups, Banking business, Economic analysis, Shortages, International relations, United States, Latin America, Africa, Foreign countries.

This report describes the worldwide housing shortage and the shelter assistance efforts of the Agency for International Development, the multilateral lending institutions, private and voluntary organizations, and certain bilateral donors. This review was made to provide an overview of the world housing situation and to identify some of the problem areas in the planning and management of housing development assistance. The report makes recommendations to assist international donors, principally the Agency for International Development, in improving their efforts to provide shelter assistance to the less developed countries.

PB-273 562/7 PC A03/MF A01
Bureau of Reclamation, Denver, Colo.
Cost-Effective Electric Power Generation from the Wind
C. J. Todd, R. L. Eddy, R. C. James, and W. E. Howell. Aug 77, 34p*
An Extended Version of a paper presented to the International Solar Energy Society, Orlando, Florida, on June 6-10, 1977.

Keywords: Wind power generation, Cost effectiveness, Wind power plants, Hydroelectric power generation, Pumped storage, Windpower utilization, Electric power transmission, *Wind energy, *Electric power, Wind energy conversion systems.

The idea of generating windpower at the windiest available sites (wind farms) is examined for its effect on feasibility of large-scale windpower input to the nationwide electric power network. Windpower is considered in association with pumped-storage hydroelectric plants for load leveling and existing types of transmission lines for interconnecting the wind farms and energy-storage sites with load centers up to 2000 km away. Potential energy harvest from wind farm sites in the 17 Western States is estimated at well over 100 GW, and many times this much in arctic North America. At the 100-GW level of development, bus bar cost at the wind farm would be about 3 mills/MJ (10 mills/kWh). Energy storage required for load leveling would add about 1.8 mills/MJ and transmission costs another 2.1 mills/MJ, for a total cost at the load center of 6 mills/MJ (21 mills/kWh), all in 1976 dollars. This would be competitive with energy generated near load centers by new nuclear or fossil-fuel powerplants. Windpower appears environmentally acceptable and avoids many of the environmental liabilities of conventional sources. Large-scale windpower implementation will require major advance commitment of capital, about $1 billion, to lower bus oar costs to 4.4 mills/MJ (16 mills/kWh). The timetable will therefore likely depend on Federal incentives.

PB-273 766/6 PC A04/MF A01
SCS Engineers, Long Beach, Calif.
Refuse Collection Vehicle Performance Specification: User's Guidebook
Final rept.
20 Sep 77, 71p NSF/RA-770265
Contract NSF-C77-04424

Keywords: Motor vehicles, Trucks, Solid waste disposal, Specifications, Manuals, Refuse disposal, Garbage, Collection, Hauling, Compacting, Performance evaluation, Management planning, Procurement, Government policies, Local government, Geography, Containers, Regulations, Process charting, Cost analysis, Service life, *Waste disposal.

This guidebook introduces the use of performance specifications in the procurement of refuse collection vehicles, presenting a methodology for developing such specifications for payload capacity, compaction cycle time, and reload time. In addition, the User's Manual, the final product of the research effort, is previewed. In this document are discussions of: (1) the concept, overview, and data sources of the performance specification process; (2) the description and purpose of the User's Manual; (3) the performance specification of vehicle payload capacity; (4) the specification of compaction cycle and reload times; and (5) life cycle costing.

PB-273 810/2 PC A02/MF A01
Kansas Water Resources Research Inst., Manhattan.
Water and Energy Conservation Through Efficient Irrigation Management
Project completion rept. 1 Jan 75-Dec 76
Loyd R. Stone. Aug 77, 25 CONTRIB-190, OWRT-A-069-KAN(3)
Contract DI-14-31-0001-5016

Keywords: Water consumption, Corn plants, Grain sorghum plants, *Irrigation, Plant growth, Rainfall, Yield, Seasonal variations, Efficiency, Soil profiles, Kansas, *Water management, *Energy conservation, Water management(Applied), Zea mays, Sorghum bicolor, Tribune(Kansas), Manhattan(Kansas).

In a 3-year study, an evaluation was made of corn (Zea mays) and grain sorghum (Sorghum bicolor) yield and water use efficiency as influenced by irrigation timing. The study was located at Tribune (mean annual rainfall of 17 inches) and Manhattan, (mean annual rainfall of 33.5 inches) Kansas. Treatments consisted of no in-season irrigation, a single in-season irrigation at one of the three different growth stages, and irrigating at each of the three selected growth stages. Selected growth stages in corn were pre-tassel, silk emergence, and blister; in grain sorghum they were boot, half-bloom, and soft-dough. Each irrigation was 4 inches at Manhattan and 6 inches at Tribune. All Tribune plots received a pre-plant irrigation in April of each year. Water was applied to basin plots using gated pipe. With no in-season irrigation the 3-year mean grain sorghum yields were greater than corn yields at both Manhattan and Tribune.

PB-274 429/0 PC A12/MF A01
National Research Council, Washington, DC.
Perspectives de la Recherche Agronomique en Afrique (Prospects for Agronomic Research in Africa)
1976, 259p
Contract AID/csd-2584
Text in French.

Keywords: Agronomy, Developing countries, *Africa, Research projects, Education, Soils, International relations, Economic development, Agricultural economics, Manpower, Organizations, Books, Requirements, Grain crops, Grasses. *Agriculture, Priorities, Institutional framework.

This study focuses on the question of how agricultural science and specifically agricultural research can contribute most effectively to the progress of the African nations and peoples. It covers the following topics: (1) Agricultural and educational priorities; (2) role of non-African agencies in coordination of agricultural research and education; (3) appropriate channels of communication and cooperation among nations and institutions within and outside of Africa; (4) means by which research and education can be applied most effectively to African agricultural development; and (5) a broad assessment of the scientific manpower needs of the research systems and institutions recommended by the NAS Committee.

PB-274 436/5 PC A06/MF A01
Washington Univ., Seattle. Coll. of Fisheries.
Aquaculture in Southeast Asia. A Historical Overview
Shao-Wen Ling. 1977, 122p* CONTRIB-465, ISBN-0-295-95560-0, NOAA-77101207
Library of Congress Catalog Card No. 77-3828.

Keywords: Ponds, *Aquaculture, *Southeast Asia, Shellfish, Fisheries, Indonesia, Philippines, Malaysia, South Vietnam, North Vietnam, Cambodia, Harvesting, Developing countries, Economic development, Reproduction(Biology), Thailand, Burma, China, Coasts, Taiwan, Singapore, Sea Grant Program.

Aquaculture had its cradle in Asia. It developed there some four thousand years ago in harmony with a traditional rural-agrarian economy, and it is now heading towards some fascinating developments. Aquaculture in the Southeast Asian region, including Indonesia, the Philippines, Malaysia, Singapore, Vietnam, Cambodia, Thailand, Burma, and the southern China coast to Taiwan is examined. The species cultured in the area are identified and the collection and production of stocking material is explained. Culturing facilities are described and information is given on aquaculture practices and techniques.

PB-274 612/1 PC A08/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Expansion des Ressources en Eau dans les Zones Arides, Techniques Prometteuses et Possibilites de Recherches (Expansion of Water Resources in Arid Regions. Promising Techniques and Opportunities for Research)
1977, 165p
Contract AID/csd-2584
Text in French.

Keywords: *Water supply, *Arid land, Developing countries, *Agriculture, Water conservation, Research projects, Water consumption, Social effect, Harvesting, Project planning, Runoff, Deserts, Reservoirs, Evaporation, Rainfall, Irrigation, Salinity, Water wells, Waste water, Water harvesting, Research needs.

Little known but promising technologies for the use and conservation of scarce water supplies in arid areas are the subject of this report. Not a technical handbook, it aims to draw the attention of agricultural and community officials and researchers to opportunities for development projects with probable high social value. Each technology is presented in a separate chapter and arranged under the following topics: methods, advantages, limitations, stage of development, needed research and development, selected readings (a short list of reviews and general articles) and contacts (a list of individuals or organizations the panelists know to be involved in relevant research).

PB-274 644/4 PC A15/MF A01
Cornell Univ., Ithaca, N.Y.
Pest Control Strategies
Final rept.
Edward H. Smith, and David Pimentel. 1977, 331p*
Contract EQ7AC012

Keywords: *Pest control, Meetings, Pesticides, Socioeconomic statu , Plants(Botany), Fruit crops, Trees(Plants), Urban areas, Potatoes, Corn, Soybean plants, Trends, Insect control, Law(Jurisprudence), Weed control, Forecasting, Organic compounds, Substitutes, Environmental surveys, *Crops, Alfalfa, Environmental chemical substitutes, Biological insect control, Computer applications.

Papers presented at a symposium held at Cornell University in June 1977, including the role of the USDA in integrated pest management, history and complexity of IPM, socioeconomic and legal aspects, obstacles and incentives, and case studies on alfalfa, deciduous tree fruits, potatoes, corn, and soybeans. (Portions of this document are not fully legible)

PB-274 715/2 PC A13/MF A01
Department of Transportation, Washington, DC.
Proceedings of the National Symposium on Transportation for Agriculture and Rural America, Held at New Orleans, Louisiana, on November 15-17, 1976
John O. Gerald, Kenneth L. Casavant, Robert J. Tosterud, and William F. Brown. 1 Aug 77, 286p*
Rept no. DOT-TST-77-33
Prepared in cooperation with Farm Foundation, Chicago, Ill., North Dakota State Univ., Fargo. Upper Great Plains Transportation Inst., and Cooperative State Research, Washington, D.C.

Keywords: *Transportation, Agricultural products, Meetings, Rural areas, International trade, Regulations, Economic impact, Services, Cargo transportation, Passenger transportation, Policies, Energy conservation, Research, Planning, United States, Rural transportation.

There is growing concern about the appropriateness of national and state transportation planning, policies, and funding arrangements for maintaining an efficient and equitable transportation system in rural America. Symposium sessions were held on the following topics: Transportation of agricultural commodities for international trade; impacts of transportation regulation on agriculture; people, commodity and service transport in rural America; economics of freight transportation in low density rural areas; and impacts on rural transportation from changes in the energy situation and transportation policies.

PB-274 759/0 PC A05/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, Ohio.
Health and Safety Guide for Plywood and Veneer Mills
Jun 77, 82p Rept no. DHEW/PUB/NIOSH-77/186

Keywords: Industrial hygiene, *Woodworking, *Health, Dust control, Noise(Sound), Guidelines, Regulations, Hazardous materials, Protective clothing, Fire protection, First aid, Sanitation, Materials handling, Atmosphere contamination control, Safety engineering, Environmental engineering, Accident prevention, Storage, Records management, Occupational safety and health, Air pollution control, Checklists, Protective equipment.

The report is intended to assist in providing for a safe and healthful work place in the plywood and veneer mills by describing safe practices and pointing out some of the more commonly violated safety and health standards. The main topics covered include: health and safety guidelines; frequently violated regulations; occupational health and environmental control; hazardous materials; personal protective equipment; fire protection; medical and first aid; sanitation; plant equipment; materials handling and storage; hand and portable power tools; welding, cutting and brazing; electrical code. (Color reproductions in black and white)

PB-275 180/8 PC A06/MF A01
Woods Hole Oceanographic Institution, MA.
Bivalve Mollusc Culture in a Waste Recycling Aquaculture System
Technical rept.
John H. Ryther, and Roger Mann. Sep 77, 119p
WHOI-77-59, NOAA-77110301
Grant NOAA-04-6-158-44106

Keywords: Mollusca, *Aquaculture, Circulation, Shellfish, Mixtures, *Waste water, Oysters, Clams, Shellfish, Substrates, Food chains, Algae, Sea water, Sewage treatment, Phytoplankton, Feeding stuffs, Ponds, Nutrients, Monitoring, Sea Grant program, Crassostrea gigas, Ostrea edulis, Mytilus edulis, Argopectin irradians, Tapes japonica, Secondary sewage treatment.

During the Sea Grant fiscal year 1976-77, research continued on the development of a waste recycling aquaculture system at Woods Hole Oceanographic Institution. In the present system mixtures of secondary treated sewage effluent and seawater are used to mass culture marine phytoplankton on a continuous basis in large outdoor ponds. These phytoplankton are then fed to filter feeding bivalve molluscs (oysters, clams, mussels). The effluent from the mollusc culture tanks is passed through cultures of macroscopic red algae to effect final removal of excess and excreted nutrients from the earlier stages of the controlled food chain. Work has centered on the effects of physical parameters on optimizing shellfish growth. Also monitoring of phytoplankton species predominance in mass algal cultures continued in an attempt to gain further understanding of this important phenomenon. Separate studies are reported on and included in this report.

PB-275 230/1 PC A05/MF A01
California Univ., Davis. Dept. of Agricultural Engineering.
Technological and Economic Assessment of the Utilization of Rice Straw Residue from the California Sacramento Valley for On-Farm Power Generation
Final rept.
Brian Horsfield, and R. O. Williams. Aug 76, 95p
ERDA/USDA-19404/76/FR-1
Contract USDA-12-14-1001-603
See also report dated 20 Oct 76, PB-275 082.

Keywords: *Electric power, Electric power generation, Biological energy conversion, *Agricultural wastes, Plant residues(Organic), Rice plants, Farm crops, Straw, Grain crops, Agricultural engineering, Gasification, Harvesting, Storage, Technology, Feasibility, Benefit cost analysis, Return on investment, California.

The report examines alternative energy uses for California Sacramento Valley rice straw residue. This area of California can produce approximately 2 million tons of straw which has enough energy to provide 30% of the fuel requirements for a 1,000 megawatt plant. The report deals with methods of harvest, collection and storage, and provides an economic assessment of several methods, including total harvest. On-farm utilization of the energy content of rice straw is discussed with regard to rice drying and irrigation pumping. Off-farm use is also considered. (Color illustrations reproduced in black and white)

PB-275 344/0 PC A05/MF A01
North Carolina State Univ., Raleigh. Sea Grant Coll. Program.
Wood in Marine Structures. Proceedings of a Seminar Held at Wrightsville Beach, North Carolina on October 7-8, 1977
Michael Levi, and Jerry Machemehl. Jul 77, 100p*
UNC-SG-77-12, NOAA-77110702
Grant NOAA-04-6-158-44054

Keywords: *Wooden structures, Structural timbers, Meetings, Marine borer prevention, *Wood preservatives, Creosote, Construction materials, Marine borers, Fungi, Fasteners, Civil engineering, Bulkheads, Harbor structures, Ship piers, Sea walls, Impregnating, Maintenance, Loads(Forces), Wood, Docks, Structural design, *Marine borers, Sea Grant program.

This is a compilation of 9 papers that were presented at the seminar on the use of wood in marine structures. The subjects dealt with are: Wood as a construction material; Marine borers and fungi; Preservative systems and specifications; Fasteners in marine structures; Waves, currents, wave forces and coastal processes; Planning, design, and construction of timber walls and bulkheads; Planning, design, and construction of piers and walkways; Use of pressure treated wood in building small boat facilities; and Wharf inspection and maintenance.

PB-275 345/7 PC A03/MF A01
Hawaii Agricultural Experiment Station, Honolulu.
An Alternative Prawn Production Systems Design in Hawaii
Technical rept.
Richard T. Gibson, and Jaw-Kai Wang. May 77, 38p
UNIHI-SEAGRANT-TR-77-05, HAES-Journal Ser-2142, NOAA-77110420
Grant NOAA-04-6-158-44026, NOAA-04-6-158-44144
Report on Tropical Animal Aquaculture--Prawn Production and Management Systems Development.

Keywords: Fresh water, Aquaculture, Crustacea, Hawaii, Economic development, Industries, Ponds, Reproduction(Biology), Design, Improvement, Savings, Cost analysis, Systems engineering, *Fishes, Macrobrachium rosenbergii, Sea Grant program.

Freshwater prawn farming is a new and dynamic growth industry in Hawaii. Considerable progress has been made in hatching and rearing techniques since they were first introduced in 1965, yet there is still considerable room for improvement, especially for the

grow-out system. The current 'Anuenue' strategy is broken down to functional components and examined in detail through use of engineering economy methods. Areas with short-term potential for improvement are identified and an alternative approach utilizing a narrow canal pond design is recommended. There are various advantages of this alternative which result in a cost savings of 14.8%. The basic short-term improvement recommended is a pond design that permits mechanization of costly operations such as feeding, harvesting, and pond maintenance and the development of sophisticated management strategies aimed at increasing yields.

PB-275 366-T PC A99/MF A01
Agricultural Research Service Washington, DC.
Pollination of Agricultural Crops by Bees (Opylenie Pchelami Sel'skokhozyaistvennykh Kul'tur)
A. N. Mol'Nichenko. 1977, 712p Rept no. TT-74-52054
Trans. of Vsesoyuznaya Akademiya Sel'skokhozyaistvennykh Nauk Doklady (USSR) v3 1960, by B. R. Sharma. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Foundation.

Keywords: Pollen, *Bees, Farm crops, Yield, Agriculture, Plants(Botany), Fruit crops, Conveyors, Production, Mortality, Vegetable crops, Economic factors, Color, Aromatic compounds, Translations, Books, Wheat plants, USSR, *Crops, *Vegetables, *Fruits, *Pollination, Angiosperms, Heterosis.

The relationships between the biology of flowering, the fertilization of plants, and the biology of bees have intrigued investigators for many years. The results of new studies and experiments, have confirmed that the cross-pollination of entomophilous plants by bees is of paramount importance not only for increasing yield and improving seed and fruit quality, but also for the production and exploitation of heterosis in a number of bee-pollinated crops. The proceedings published in the present volume illustrate this point with new material. The book provides interesting material for agronomists, apiculturists, plant breeders and professional bee-keepers.

PB-275 434/9 PC A03/MF A01
International Ferrocement Information Center, Bangkok (Thailand).
The Potentials of Ferrocement and Related Materials for Rural Indonesia; a Feasibility Study
Ricardo P. Pama, and Opas Phromratanapongse. Oct 77, 28p
Sponsored in part by Agency for International Development, Djakarta (Indonesia). Prepared in cooperation with Siam Cement Co. Ltd., Bangkok (Thailand).

Keywords: Construction materials, *Indonesia, Developing countries, Pontoons, Water tanks, Storage tanks, Grains(Food), Well casings, Toilet facilities, Boats, *Ferrocement, Appropriate technology.

This report summarizes the results of a short feasibility study conducted in Indonesia by a ferrocement team from the Asian Institute of Technology. Ferrocement has been identified as an appropriate technology material with many potential applications in developing countries especially in the rural areas. Field visits were made during the period October 4-18, 1977 in West Java, South Sulawesi and North Sumatra to obtain first hand information about the conditions of the rural people. The primary result of the survey is the identification of seven (7) potential applications of ferrocement and related materials, these are: pontoons, dugout canoes, water jars, toilet bowls, well casings, grain storage bins and building boards. The report recommends that extensive testing, field demonstration and evaluation be conducted to determine especially their social acceptability by the villagers before full-scale implementation is undertaken.

PB-275 466/1 PC A09/MF A01
Utah Water Research Lab., Logan.
Optimizing Crop Production through Control of Water and Salinity Levels in the Soil
J. I. Stewart, R. M. Hagan, R. J. Hanks, W. T. Franklin, and W. C. Pruitt. Sep 77, 200p PRWG-151-1, OWRT-B-121-UTAH(2)
Contract DI-14-31-0001-5120
See also PB-258 051. Prepared in cooperation with Consortium for International Development, Logan, Utah. California Univ., Davis. Colorado State Univ., Fort Collins and Arizona Univ., Tucson.

Keywords: *Irrigation, Farm crops, Corn plants, Water consumption, Salinity, Water supply, Plant growth, Yield, Evapotranspiration, Lysimeters, Soil water, Sprinkler irrigation, Utah, *Water management, Model studies.

The research was carried out by four universities belonging to the Consortium for International Development (CID) in cooperation with the four Water Research Centers. Similar field experiments with corn were carried out in 1974 and 1975 at the University of Arizona (Yuma Field Station), the University of California (Davis), Colorado State University (Fort Collins), and Utah State University (Logan). The objectives were to develop production functions for estimating how crop yield is influenced by different levels of salinity and water supply at different stages of crop growth; and to formulate and test models for predicting yields as a function of water and salinity stress across a broad spectrum of climate and soil types. A unique and significant feature of the study was the establishment of a sufficient data base to test the transferability of the results, and to accomplish this feature, the research was conducted on a regional basis with data collection at the four different locations. All irrigation was applied with a line source sprinkler system, developed in Utah, which gave a continuously variable amount of irrigation water on each side of the line. The maximum evapotranspiration (ET) was estimated at all locations and measured with lysimeters at California. Evapotranspiration (ET) was calculated at all plots as the sum of precipitation, irrigation, and soil water depletion minus drainage (estimated). Yields of dry matter and grain were measured at the end of each growing season. This study has provided an extensive data base on how corn yields respond to moisture deficiency and salinity stress under different soil and climatic conditions.

PB-275 569/2 PC A04/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.
Pyrolytic Conversion of Agricultural and Forestry Wastes to Alternate Energy Sources in Indonesia; a Feasibility Study
John W. Tatom, Filino Harahap, Tze I. Chiang, R. Muchidin Apandi, and Harsono Wirjosumarto. Feb 77, 54p
Contract AID/ASIA-C-1203
Prepared in cooperation with Institute of Technology Bandung (Indonesia). Development Technology Center, and Padjadjaran Univ., Bandung (Indonesia).

Keywords: *Agricultural wastes, *Wood wastes, *Pyrolysis, *Indonesia, Reclamation, Solid waste disposal, *Fuels, Charcoal, Oils, Manufactured gas, Economic analysis, Design, Feasibility, *Waste recycling.

The study was conducted in Indonesia in a joint effort by personnel from the Engineering Experiment Station at the Georgia Institute of Technology and the Development Technology Center at the Institute of Technology Bandung. The principal circumstance that led to the study is the severe firewood cutting of the forests, especially in Java, which has resulted in damage to soil, water, and mangrove resources, with the resulting need for an alternate source of fuel for cooking. The study involved (1) an investigation of the production of agricultural and forestry wastes in Indonesia; (2) an evaluation of the market for the char, oil, and gas which are products of the pyrolytic conversion process; (3) the development of a preliminary pyrolytic conversion system design; and (4) an approximate economic evaluation of the system. The primary results of the waste survey indicate that at least 17 million tons of wastes are produced in Indonesia each year, with rice hulls comprising a third of the total and sawmill, coconut, logging, rubber, oil palm wastes and bagasse comprising the remainder. From the available wastes it is estimated that about 1.5 million tons of charcoal and .9 million tons of pyrolytic oils could be produced.

PB-275 654/2 PC A15/MF A01
Metcalf and Eddy, Inc., Palo Alto, Calif.
Urban Stormwater Management and Technology: Update and Users' Guide
Final rept. Jul 75-Jan 77
John A. Lager, William G. Smith, William G. Lynard, Robert M. Finn, and E. John Finnemore. Sep 77, 333p* EPA/600/8-77/014
Contract EPA-68-03-2228
Supplement to report dated Dec 74, PB-240 687.

Keywords: Storm sewers, Combined sewers, Overflows, Urban areas, Reviews, Surface water runoff, Waste water, Hydrology, Water quality, Sources, Monitoring, Cost effectiveness, Improvement, Storage tanks, Mathematical models, Control equipment, *Waste water reuse, Storm water runoff, Urban hydrology, Best management practices.

A continuation and reexamination of the state-of-the-art of storm and combined sewer overflow technology is presented. Essential areas of progress of the stormwater research and development program are keyed to the approach methodology and user assistance tools available, stormwater characterization, and evaluation of control measures. Results of the program are visible through current and ongoing master planning efforts. Assessment of urban runoff pollution is referenced to the developing national data base, localized through selective monitoring and analysis, and quantified as to potential source and magnitude using techniques ranging from simplified desktop procedures to complex simulation models. Stormwater pollutants are characterized by (1) source potential, (2) discharge characteristics, (3) residual products, and (4) receiving water impacts. Control and corrective measures are separated into nonstructural, termed Best Management Practices (BMPs), and structural alternatives. Best Management Practices focus on source abatement, whereas structural alternates roughly parallel conventional wastewater treatment practices of end-of-the-pipe correction. For combined sewer overflow abatement, increasing degrees of structural control is necessary. Successful program implementation is illustrated for several selected case histories.

PB-275 658/3 PC A04/MF A01
Energy Task Force, Inc., New York.
Windmill Power for City People
Final rept.
Mary Christianson. May 77, 73p* OEO-LN-2137
Grant CSA-20156

Keywords: Windmills, Windpower utilization, Wind power generation, Urban areas, Wind turbines, Windpowered generators, Power transmission towers, Design, Drawings, Systems engineering, New York, *Wind energy, New York City(New York).

This report discusses the first urban windmill used as an alternative energy source. The windmill was designed and installed at 519 East 11th Street, a tenement building in New York City. Findings show that the energy produced from the windmill is an important renewable energy resource which can be used in most urban areas and which reduces dependency on utility companies. A brief history of the windmill's origin, design and installation procedures are outlined. Also included are comparisons of energy savings of the windmill energy versus the utility companies. An appendix consists of literature, resources, a wind speed and direction map of the USA, structural engineering calculations and an explanation of windforces on windmills.

PB-275 811/8 PC A07/MF A01
National Demonstration Water Project, Washington, DC.
Rural Community Action: Status and Recommendations
Final rept.
Stanley Zimmerman. Oct 77, 137p* OEO-LN-2147
Grant OEO-30141G-77-01

Keywords: *Community development, Rural areas, Projects, Services, Low income groups, Policies, Management, Housing studies, Medical services, Unemployment, *Socioeconomic status, Community Action Programs, Poverty groups, Antipoverty programs.

The report is an evaluation of the Community Action Program in rural America. The report describes the conditions and problems of the poor in rural areas: limited resources and mobility, lack of necessary job skills, poor housing stock and inadequate health care. In addition, the poor lack visibility and local officials are unwilling to rely on formal antipoverty programs. Successful rural community action programs are described and recommendations for future directions are given.

PB-275 958/7 PC A02/MF A01
Texas A and M Univ., College Station. Dept. of Wildlife and Fisheries Sciences.
Crawfish and Freshwater Shrimp Diseases
Report on Sea Grant Program
S. K. Johnson. 1977, 20p* TAMU-SG-77-605, NOAA-77112805

Keywords: Shrimps, Parasites, Crustacea, Fresh water, Diseases, Bacteria, Fungi, Protozoa, Worms, Microorganisms, Aquatic animals, *Aquaculture, *Animal diseases, Sea Grant program, Crayfishes, Commensalism, Procambarus.

The handbook is designed as an information source and field guide for crustacean culturists, commercial fishermen and others interested in parasites or abnormal conditions of freshwater crustaceans. In addition to detailed descriptions and illustrations of the common parasites and commensals, the publication includes information on the life cycles and general biological characteristics of disease producing organisms which spend all or part of their life cycles with crawfish and freshwater shrimp. Several conditions of unknown cause are also described. This guide concentrates on living agents and on illustrations and photographs of the structure and effects of such agents. (Color illustrations reproduced in black and white)

PB-276 055/1 PC A03/MF A01
Integrative Design Associates, Inc., Washington, DC.
Appropriate Technology and Agriculture in the United States
A. Becker, and E. Eccli. 1977, 29p NSF/RA-770065
Grant NSF-ERS76-21350

Keywords: Policies, *Agriculture, Ecology, Recommendations, Environmental impacts, Citizen participation, Pest control, Income, Planning, Employment, Food processing, Constraints, Surveys, Marketing, Transportation, Food supply, Project planning, Urban areas, Research needs, Assessments, USA, Appropriate technology, Energy demand, Agribusiness, Organic farming.

The purpose of this report is to survey those in the United States currently active in the field of appropriate technology, describe their efforts, explore factors inhibiting the development and application of their innovations, report on their recommendations for Federal and National Science Foundation activities in support of appropriate technology and assess the policy implications of appropriate technology. Two hundred and ninety-four individuals and groups from target populations concerned with issues related to the environment, local participation in planning and technology development, and unemployment/income stabilization responded to this survey. This paper is a compilation of the major ideas of approximately 40 individuals and groups who responded to the survey primarily because of their interests in the agricultural dimension of appropriate technology.

PB-276 129/4 PC A04/MF A01
General Accounting Office, Washington, D.C. International Div.
U.S. Participation in International Agricultural Research
Report to the Congress.
27 Jan 78, 64p* Rept no. ID-77-55

Keywords: *Agriculture, Research projects, Developing countries, International relations, Research management, Project planning, Universities, Organizations, Recommendations, Financing, Vegetables, Fertilizers, Pest control, Vertebrates, Birds, Rodents, Bats, Nutrition, Food, *Technical assistance, Priorities.

The importance of research to aid developing countries in meeting their food needs is being emphasized increasingly. Much attention has focused on the international agricultural research centers as a result of the development of high-yield varieties of rice and wheat which created the hope of a 'Green Revolution.' This report examines the Agency's support of international agricultural research centers and its research strategy and makes recommendations for improving management of the program.

PB-276 174/0 PC A04/MF A01
Williamson Engineering Associates, Inc., Navarre, Fla.
The Application of Wind Energy Systems to Desalination
Edgar A. Cadwallader, John E. Westberg, and William R. Williamson. 22 Apr 77, 68p OWRT/S-78/1
Contract DI-14-34-0001-7523

Keywords: Desalting, Wind power generation, Water treatment, Economics, Electric power generation, Brackish water, Electrodialysis, Reverse osmosis, Technology, Potable water, Water pollution, *Wind energy, *Desalination, Wind turbines.

The impact of rapidly increasing fuel costs has all but made saline water conversion uneconomical. However, the application of wind energy systems to membrane processes for brackish water conversion offers an economical solution. Commercially available wind turbines and those under development appear promising for producing electrical energy at costs ranging from five cents down to 1.8 cents per kilowatt hour. It is still possible to reach costs for desalting brackish water at less than $1.00 per thousand gallons with large wind energy/desalination systems. The coupling of wind energy turbines to electrodialysis and reverse osmosis also offers technological advantages, such as variable energy outputs from wind turbines, to optimize variable fluid flows in the desalination processes for maximum, economic production of potable water. Research and development efforts in this direction are indicated.

PB-276 469/4 PC A07/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Methane Generation from Human, Animal, and Agricultural Wastes
1977, 136p*
Contract AID/csd-2584
Library of Congress Catalog Card no. 77-92794.

Keywords: *Methane, Solid waste disposal, Plants(Botany), *Agricultural wastes, Sewage, Design criteria, Public health, Benefit cost analysis, Anaerobic processes, Fermentation, Economic analysis, Feasibility, Technology, Microbiology, Substrates, Storage, Performance evaluation, Safety,*Bioconversion, *Waste recycling, *Animal wastes, Refuse derived fuels, Energy sources, Manure, Manufactured gas, Synthetic fuels.

Contents:
- Overview--(Introduction and history, System description, and Economic feasibility of methane production);
- Technology of anaerobic fermentation--state of the art--(Biological mechanisms, Raw materials and their preparation, Product storage and use, Residue composition, storage, and use, and Public health aspects);
- Technology of anaerobic fermentation;
- Engineering process design--(General design considerations, Design criteria, Operation and maintenance, Performance measurement, and safety);
- Research and development needs--(General issues, and technical R&D issues).

PB-276 507/1 PC A05/MF A01
Instituto de Capitacion, Guatemala City. Dept. Tecnico Didactico.
Manual Talla de Madera (Wood Carving Manual)
1945, 97p Rept no. MD-41
Text in Spanish.

Keywords: *Woodworking, Manuals, *Wood products, Spanish language, Instructional materials, Tools, *Handicrafts.

The report contains instructions in Spanish in carving and finishing objects of wood.

PB-276 522/0 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Further Research on Road Accident Rates in Developing Countries
G. D. Jacobs, and P. R. Fouracre. 1977, 29p Rept no. TRRL-SUPPLEMENTARY-270
Also pub. as ISSN-305-1315.

Keywords: Motor vehicle accidents, Developing countries, Statistical analysis, Casualties, *Transportation management, *Roads, Injuries, Kenya, Zambia, Nigeria, Malawi, Great Britain.

Using published data, a study was made of changes in road accident rates over the ten year period 1961-71 in a number of developing countries. It was found that in the majority of countries there was a continuing downward trend in fatality and injury rates per licensed vehicle. Kenya, Jamaica, Zambia, Malawi and Nigeria are notable exceptions and detailed road accident data were used to try to determine underlying factors associated with the increases in fatality and injury rates per licensed vehicle in these countries. In 28 developing countries for which data were available in 1968 and 1971, fatalities per licensed vehicle were found to be related to vehicle ownership levels, the higher the vehicle ownership level, the lower the fatality rate.

PB-276 668/1 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Road Accidents as a Cause of Death in Developing Countries
G. D. Jacobs, and Marguerite N. Bardsley. 1977, 23p Rept no. TRRL-SUPPLEMENTARY-277
Also pub. as ISSN-0305-1315.

Keywords: Motor vehicle accidents, Casualties, Developing countries, Statistical analysis, *Transportation management, *Roads, Comparison, Diseases, Kenya, Hospitals, Great Britain.

Using published data, a comparison was made in fifteen developing countries of the number of deaths from road accidents and the deaths from specific diseases normally associated with the Third World. It was found that road accidents accounted for almost 17 per cent of the total number of deaths studied, a value exceeded only by deaths from enteritis (and other diarrheal diseases). The trends in the number of deaths per head of population in four countries over the period 1960-72 were calculated. It was found that while the rates for infectious, intestinal and respiratory diseases decreased, the death rate for road accidents increased over this period. An analysis of the medical records of the three major hospitals in Nairobi showed that there were more in-patients receiving treatment for road accidents in 1974 than for all but one of the groups of diseases thought to be of concern in developing countries. In two of the hospitals studied, the treatment of road accident cases accounted for over 13,000 in-patient days, over 5 per cent of the total available. (Copyright (c) Crown Copyright 1977.)

PB-276 746/5 PC A03/MF A01
Economic Development Administration, Washington, DC. Program Analysis Div.
Source Bibliography Employee Stock Ownership Plans (ESOP)
Oct 77, 37p* Rept no. EDA-78-032

Keywords: Employees, Investments, Capital, Bibliographies, Corporations, Industries, Incentives, Motivation, Savings, Benefits, Legislation, *Employee participation, Employee stock ownership

The bibliography was compiled with the assistance of three useful research tools: the SCORPIO data bank maintained by the Library of Congress; the New York Times data bank; and an ESOP bibliography prepared by the Congressional Research Service. Employee Ownership Plans have been viewed as a means of improving employee motivation and productivity, diversifying the ownership of capital, providing alternatives to conventional compensation and benefit plans, and saving jobs. An Employee Stock Ownership is an employee benefit program through which employees can acquire part or all of the stock in the corporation for which they work. Since the ESOP Act of 1973, four additional pieces of legislation have been adopted relating to the use of the employee stock ownership concept.

PB-276 908/1 PC A08/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
The Impact of Groundwater Development in Arid Lands: A Literature Review and Annotated Bibliography
Information paper
Susan Jo Keith. 1977, 153p* ARID LANDS RESOURCE-IP-10, OWRT-W-197(5254)(2)
Contract DI-14-31-0001-5254

Keywords: *Ground water, *Water pollution, *Arid land, *Water supply, Bibliographies, Environmental impacts, Social effect, Economic impact, Economic development, Subsidence, Developing countries, Stream flow, Agriculture, Irrigation, Reviews, Aquifers, American Indians, Arizona, Pakistan, *Water management.

As groundwater comes increasingly under development, it is imperative, for economic, ecological, and political reasons, to anticipate the impact of its development. The literature is reviewed on this impact in arid lands in terms of two general categories: physical environment impacts and socioeconomic impacts. Two case studies are presented: One focuses on the impact of groundwater development on the Papago Indians; the second, through a discussion of groundwater development in Pakistan, demonstrates the role groundwater development can play in the economic development process in developing arid countries.

PB-276 946/1 PC A04/MF A01
Michigan Univ., Ann Arbor. Inst. for Social Research.
Employee Ownership. Employee Stock Ownership Plan (ESOP), Survey Research Center, Institute for Social Research, University of Michigan
1978, 70p* EDA-78-029
Grant EDA-99-6-09433

Keywords: Economic development, Technical assistance, Capital, Assets, Purchasing, Employees, Benefits, Profits, Investments, Economic evaluation, Industries, Corporations, Statistical analysis, *Employee participation.

The study is about one of the most recent variations to emerge in the Employee Stock Ownership Plan, or ESOP, which permits employees to acquire up to 100 percent of the equity of the firm for which they work. This plan not only affords a real increase in property ownership for the workers as individuals, but also serves as an instrument for new corporate capital formation. Data have been collected on 98 firms, including such information as industry type, number of employees, magnitude of sales volume, the percent of employees who participate in the ownership plan. In thirty of the companies we were able to obtain actual data about profit and we therefore analyzed for this sub set of companies the relationship between profit and some of the aspects of ownership.

PB-276 972/7 PC A08/MF A01
Forest Service, Portland, Oreg. Div. of Engineering.
Guidelines for Use of Fabrics in Construction and Maintenance of Low-Volume Roads
Interim rept.
John E. Steward, Ron Williamson, and John Mohney. Jun 77, 174p*

Keywords: Fabrics, Pavements, *Roads, Nonwoven fabrics, Woven fabrics, Pavement bases, Fluid filters, Drainage, Separators, Reinforcing materials, Soil stabilization, Waterproofing, Barrier coatings, *Soil erosion, Erosion control, Earthwork, Permeability, Cost analysis, Soil mechanics, Road materials.

Porous woven and non-woven fabrics have been used in road construction in Region 6 since 1974. The fabrics have been used: (1) as filters for subsurface drainage; (2) separation layers to prevent subgrade soil contamination of base layers; (3) subgrade restraining layers for weak subgrades; (4) earth reinforcement to build retaining walls; (5) erosion control, and (6) water proofing membranes. A reference notebook titled 'Fabrics in Construction' is due for release to Region 6 Forests in June 1977. This notebook contains a description of current practices and the state-of-the-art in the use of fabrics in road construction and maintenance. The notebook defines terminology and lists the key factors involved in each usage, and relates the fabric physical and chemical properties to the intended usage. The notebook also contains appropriate technical literature, manufacturers' literature and cost data on the known available fabrics. This report highlights the contents of the reference book and discusses the current knowledge for the use of fabrics in low-volume road construction and maintenance.

PB-277 030/3 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Structural Design and Laying of Small Underground Drains of Rigid Materials
O. C. Young. 1977, 26p Rept no. TRRL-SUPPLEMENTARY-303

Keywords: Underground drains, Sewer pipes, Drains, Structural design, Pipe joints, Soil compacting, Backfills, Materials specifications, Great Britain, *Sewage disposal, *Pipes(Tubes).

Factors affecting the choice of different types of pipes of rigid materials for use in small underground drains or sewers are discussed. Various methods of bedding them are described, with their merits and limitations, and tables are included giving the range of permissible cover depths for the various pipes when laid on these beddings. (Copyright (c) Crown Copyright 1977.)

PB-277 515/3 PC A02
California Univ., Bodega Bay. Bodega Marine Lab.
Development of Crustacean Aquaculture
R. A. Shleser. 1975, 18p NOAA-78011702
Grant NOAA-04-5-158-20
Pub. in European Symposium on Marine Biology (10th), Ostend, Belgium 17-23 Sep 75, v1 p455-471 1975.

Keywords: *Aquaculture, Food chains, Algae, Crustacea, Lobsters, Crabs, Feeding stuffs, Diets, Water quality, Tanks(Containers), Design, Growth, Systems engineering, Cost engineering, Reprints, Homarus americanus, Cancer magister, Macrobrachium rosenbergii.

The Aquaculture Program of Bodega Marine Laboratory is an interdisciplinary effort directed toward the development of aquaculture technology. The primary area of emphasis is the culture of the American lobster Homarus americanus. Research in the areas of water quality, nutrition, genetics, physiology, pathology, microbiology, algology, engineering and economics, have been integrated to emphasize the understanding of the economics of culture. The presentation describes how work in each of these areas has general application to the culture of other species. The culture of Dungeness crabs, freshwater prawns and other crustaceans are currently being investigated. Recent regulations requiring strict control of levels of metabolites in mariculture effluents have led to investigations of the potential of various species of algae to take up ammonia, nitrate, and nitrite. These algae may then serve as food for shellfish such as oysters, clams, scallops, and mussels. The economics of these food chains are discussed.

PB-277 728/6 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Forecasting Rural Road Travel in Developing Countries from Studies of Land Use
J. D. G. F. Howe, and B. S. Tennant. 1977, 38p Rept no. TRRL-SUPPLEMENTARY-754

Keywords: Developing countries, Rural areas, Travel, Forecasting, Roads, Surveys, *Land use, Interviews, Kenya, Vehicular traffic, Planning, Great Britain, *Road transportation, Vehicle ownership.

In many developing countries, the difficulty of standardizing trip measurements, the flexibility with which vehicles are used and the absence of a conventional sampling frame for interviewing road users are the main obstacles to forecasting travel from land use. A study in Kenya has shown the difficulties of using roadside interviews for establishing trip relationships, but has indicated that a suitable sampling frame could be constructed by a direct survey of vehicle owners. The vehicle owner in the broadest sense would then become the fundamental unit for trip studies. The Report suggests that home and workplace questionnaire surveys, focussing on the vehicle owner, may be suitable for the extensive sampling necessary to evolve standards for studies of rural trip characteristics. Definitions of employment suitable for land-use/transport studies in developing countries are suggested in the Report. These covered only 4 percent of the population of the study area, but nevertheless, statistically they provided the best explanation both for vehicle ownership and for trip generation. Trip origins from Agricultural and Residential land uses did not reach significant proportions. The main generators were Retail and Commercial, Road Transport, and Government Administration land uses, which together accounted for over 75 percent of urban trip origins and 57 percent of all trip origins. (Copyright (c) Crown Copyright 1977.)

PB-277 769/6 PC A15/MF A01
Pusat Penyelidikan Masalah Kelistrikan, Djakarta (Indonesia).
Technical Forum on Direct Current Transmission Held in Djakarta on 18-19 October 1976
1977, 328p Rept no. LMK-03-EP-77
Sponsored in part by Technology Transfer Inst., Tokyo (Japan) and Electric Power Development Co. International Ltd., Tokyo (Japan).

Keywords: *Electric power, Meetings, HVDC systems, DC systems, Power transmission lines, High voltage, Electric converters, Overhead power transmission, Oil-filled cables, Submarine cables, Thyristors, Switchgear, Control equipment, Circuit protection, Transformers, *Indonesia, *Power equipment.

Contents:
- Outline of high voltage DC transmission;
- Equipment and components of direct current transmission systems;
- Prospects for Indonesia;
- Transmission line;
- D.C. cable and accessories. (Portions of this document are not fully legible)

PB-278 033/6 PC A07/MF A01
National Inst. for Occupational Safety and Health, Cincinnati, Ohio.
Health and Safety Guide for Sawmills and Planing Mills
Jul 77, 132p* Rept no. NIOSH-78-102

Keywords: Safety engineering, *Sawmills, Milling machines, Guidelines, Machine tools, Planing, *Woodworking, Workplace layout, Requirements, Standards, Industrial hygiene, Safety devices, Ventilation, Hazardous materials, Personnel development, Accident prevention, Human factors engineering, Protective equipment, Fire safety, Occupational safety and health.

The guide assists in providing a safe and healthful workplace for sawmills and planing mills. It describes safe practices and helps correct some of the more frequently encountered violations of the safety and health standards. The main topics covered include: the hazards most commonly encountered in saw mills; health and safety guidelines and programs; tools and equipment; walking and working surfaces; standard guard rails; exits and exit markings; occupational health and environmental control; ventilation; noise exposure; hazardous materials, spray painting; personal protective equipment; respiratory protection; sanitation; medical and first-aid; fire protection; compressed air equipment; powered industrial trucks; hoisting equipment; machinery and machine guarding; electrical code.

PB-278 862/6 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economic Analysis Div.
Farmer-to-Consumer Marketing
Final rept.
H. R. Linstrom. Feb 78, 31p Rept no. ESCS-01

Keywords: Agricultural products, *Marketing, *Vegetables, *Fruits, Profits, Cosumer affairs, Benefits, Quality, Legislation, Direct marketing, Farmer to consumer Direct Marketing Act 1976, Farmers markets.

Estimates indicate there were over 13,000 farmer-to-consumer direct-marketing outlets in the United States in 1976. Farmers view this as an alternative market outlet to increase their income. Consumers see it as a means of getting fresher, higher quality foods at less cost. Consumers also see social and cultural benefits from direct contacts with farmers, visits to farms, and a so-called return to nature. Passage of the Farmer-to-Consumer Direct Marketing Act of 1976 reflects national interest in direct marketing of farm products, and there is strong evidence of increased attention at the state level.

PB-278 986/5 PC A03/MF A01
National Rural Water Association, Washington, DC.

Rural Water and Sewer Systems Problems, Needs, Issues, Opportunities, and Goals: A Report on the Proceedings of the National Organizational Conference of the National Rural Water Association (1st) Held in Oklahoma City, Oklahoma on April 15-16, 1976
Aug 76, 47p EDA-78-065

Keywords: Sewers, *Sewage treatment, *Water supply, Meetings, Objectives, Rural areas, Population growth, Financing, Public health, Specialized training, Management, Design, Maintenance, State government, Legislation, Local government, National government.

The purpose of this report is to describe and define briefly the principal problems, issues, opportunities and goals which have a significant impact upon the stability and growth of rural water and sewer system throughout this country. The source for this material is the series of conference sessions held by representatives of eight State Rural Water Associations at the organizational meeting in Oklahoma City. The proceedings were heavily oriented toward water supply systems.

PB-278 999/8 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economic Analysis Div.
An Assessment of Anaerobic Digestion in U.S. Agriculture
Final rept.
Ted Thornton. Mar 78, 45p* Rept no. ESCS-06

Keywords: Digestion(Decomposition), Anaerobic processes, *Methane, Agriculture, Anaerobic bacteria, *Agricultural wastes, Cattle, Fertilizers, Economic analysis, Feeding stuffs, Design, Fuels, Digesters, Sludge, Cost analysis, Feasibility, Production, Assessments, *Bioconversion, *Manures.

Anaerobic digestion is a biological process in which bacteria break down organic matter to produce methane, partially stabilized effluent, and other products. Although the process has been advocated as a source of fuel, feed, and fertilizer, its widespread adoption in American agriculture is doubtful. The cost and complexity of most digestive systems make them difficult to incorporate in agricultural operations. Although site specific applications may be feasible, these will not have a major impact on the agricultural sector. As a source of energy, there is little possibility of anaerobic digestion providing even a small percentage of national energy requirements.

PB-279 193/7 PC A08/MF A01
Arizona Univ., Tucson. Dept. of Systems and Industrial Engineering.
Appropriate Technology for Natural Resources Development: An Overview, Annotated Bibliography, and a Guide to Sources of Information
Robert L. Bulfin, and Harry L. Weaver. 1977, 174p
Grant AID/ta-G-1111
Report on Arid/Semi-Arid Natural Resources Program.

Keywords: Technology, Economic development, Bibliographies, Developing countries, Organizations, History, Industries, Agriculture, Water supply, Irrigation, Indexes(Documentation), Data sources, *Natural resources, Appropriate technology, *Information sources, Intermediate technology.

The purpose of this paper is to acquaint the interested reader with the subject matter commonly referred to as Intermediate Technology (IT). The paper is an attempt to capture the essence of the subject by providing an overview, with the bibliography used to obtain additional details. For those who wish to pursue the subject beyond the citations presented in the bibliography, Appendix A, a guide to the sources of information (i.e. indices, journals, and practicing organizations) on Appropriate and/or Intermediate Technology, is included. A brief history of the development of IT is given, followed by its thematic framework. Examples of IT in developing countries are then presented to familiarize the reader with the breadth of applications. The question, Is Intermediate Appropriate, is also discussed.

PB-279 211/7 PC A20/MF A01
International Research and Technology Corp., McLean, Va.
An Assessment of Controlled Environmental Agriculture Technology
Final rept.
Lawrence H. de Bivort, Theodore B. Taylor, and Miguel Fontes. 17 Feb 78, 476p IRT-469-R, NSF/RA-780024
Contract NSF-C1026

Keywords: Farm crops, *Vegetables, *Agricultural economics, Assessments, Economic impact, Environmental impacts, Agronomy, Cost analysis, Water conservation, Shortages, Farms, Production, Food storage, Solar energy, Greenhouses, Operating costs, Soil conservation, Employment, Transportation, *Crops, Controlled environment agriculture.

Assessment of the economic, environmental, social, and other impacts of large scale use of technology for growing food inside enclosures, Controlled Environment Agriculture (CEA), was initiated to alleviate the agro-food problems of environmental degradation; shortages of arable land, water, and fertilizers; and unreliable production. Primary conclusions were: (1) Large scale use could alleviate these problems; (2) costs of present systems are too high for agronomic crops, but acceptable for some high value fresh vegetables; (3) new systems can be made at lower costs and less total energy consumption; (4) there is a need to link R&D to open field agriculture, solar energy systems, water management, and low-cost structures; and (5) CEA should be used with solar energy and water management systems for large communities. The study includes a conceptual analysis of future systems, cost evaluations, and a diffusion analysis of non-economic considerations.

PB-279 405/5 PC A15/MF A01
Texas A and M Univ., College Station. Sea Grant Coll. Program.
Proceedings of the Annual Tropical and Subtropical Fisheries Technological Conference of the Americas (2nd) Held in Biloxi, Mississippi on April 17-20, 1977
Ranzell Nickelson, II. Oct 77, 344p TAMU-SG-78-101, NOAA-78020604
Grant NOAA-04-6-158-44012

Keywords: *Fisheries, Tropical regions, Meetings, Fishing, Lobsters, *Food processing, Byproducts, Seafood, Fish protein concentrates, Food storage, Shrimps, Shellfish, Fishes, Marketing, Exports, Tunas, Atlantic Ocean, Fish silage.

The 28 papers presented at the Second Annual Tropical and Subtropical Fisheries Technological Conference of the Americas, held in Biloxi, Mississippi, on April 17-20, 1977, are compiled in this report. Subjects vary from stock assessments, to processing and byproducts, and production and marketing.

PB-279 440/2 PC A08/MF A01
Material Systems Corp., Escondido, Calif.
A Study of the Feasibility of Utilizing Solid Wastes for Building Materials. Phase I Summary Report
B. L. Duft, H. Levine, and A. McLeod. Apr 78, 164p* EPA/600/2-78/091
Contract EPA-68-03-2056

Keywords: Construction materials, Solid waste disposal, Industrial wastes, Reclamation, Reinforced plastics, Management planning, Composite materials, Reinforcing materials, Fillers, Fly ash, Glass, *Agricultural wastes, Cellulose, Fibers, Phenolic resins, Bagasse, Cements, Starches, Lignin, Wood wastes, Sludge disposal, Laboratory tests, Performance evaluation, Furfurals, *Building materials, Manure, Rice hulls, Plastic recycling, Glass recycling, Sewage sludge, *Waste recycling.

This document reports on a study to research and develop building materials containing organic and inorganic wastes and waste-derived products. A comprehensive literature search was conducted to review and evaluate wastes with potential as matrices, reinforcements, or fillers in building composites. The most promising candidates were evaluated with limited laboratory studies. From these studies, two types of matrices, furfural-phenolic and inorganic, were selected for further study. Seven reinforcement candidates and five filler candidates were selected for evaluation with the two matrices.

PB-279 445/1 PC A09/MF A01
Nebraska Univ., Lincoln. Dept. of Agronomy.
Genetic Improvement of Productivity and Nutritional Quality of Wheat
Research rept. 1 Apr 76-31 Mar 77
V. A. Johnson, and P. J. Mattern. 31 Mar 77, 183p
Contract AID/ta-C-1093

Keywords: Nutritive value, *Wheat, Wheat plants, Plant genetics, Breeding, Proteins, Metabolism, Lysine, Photosynthesis, Nitrogen fixation, Plant physiology, Laboratory animals, Rats, Bioassay, Yield, Quality, Tables(Data), Field tests, Winter wheat plants, Spring wheat plants.

Partial contents:
- Genetics and breeding;
- Chemical and physical characterization of nutritionally improved wheats;
- International evaluation;
- Physiological studies of high yield and high protein metabolism;
- Nutritional evaluation;
- Information, germplasm exchange, technical assistance and training.

PB-279 517/7 PC A08/MF A01
Economic Research Service, Washington, DC. Foreign Development Div.
Controlled Environment Agriculture: A Global Review of Greenhouse Food Production
Foreign agricultural economic rept. (Final)
Dana G. Dalrymple. Oct 73, 164p Rept no. FAER-89

Keywords: Horticulture, *Greenhouses, *Agricultural economics, Developing countries, Food, Production, Lettuce, Tomatoes, *Vegetables, Heating, Cooling, Carbon dioxide, Soils, Irrigation, Fertilizers, Capital, Polymeric film, Fixed investments, Manpower, Operating costs, Global.

Controlled environment crop production is most nearly approached, on a commercial scale, in greenhouses. Greenhouses have been used for food production for over a century, mainly in developed regions. The introduction of plastic film during the 1950's lowered construction costs and made it possible for less affluent nations to use greenhouses. Among the newer techniques of environmental control used commercially are artificial cooling, carbon dioxide enrichment, use of artificial soil, and automated irrigation with liquid fertilizers. Greenhouse labor and capital requirements per unit of land exceed those for outdoor food crop production. Much of the work must be done by hand; there are usually few economies of scale beyond family-sized operations. Capital investments for glasshouses in developed nations commonly exceed $100,000 per acre. The most important crops produced worldwide are tomatoes, cucumbers, and lettuce. On a global basis, environmental control via greenhouses will be increasingly important in agriculture.

PB-279 775/1 PC A07/MF A01
Nebraska Univ., Lincoln. Water Resources Center.
Water Problems in the Rural Environment; Alternative Solutions for Water Supply and Wastewater Disposal. Proceedings of a Conference Held at Lincoln, Nebraska on November 4-5, 1976
1978, 142p

Keywords: *Sewage disposal, *Water supply, Rural areas, Meetings, Monitoring, Water quality, Water law, Policies, Social effect, Financing, Water wells, Water distribution.

The purpose of this conference was to describe the current rural water situation. Rural water supply and wastewater disposal problems, including both quality and quantity, were considered. The socio-economic and technological aspects of alternative solutions to rural water problems and the various impacts involved in changing or improving the current situation were examined. Future research and related needs to solve various rural water problems were outlined. The conference focused on domestic and farmstead use of water and included considerations of supply systems ranging from that required for an individual home to that required for a small community.

PB-280 100/9 PC A05/MF A01
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.

Puerto Rico's Water Resources Problems and Research Needs. Proceedings of Conference and Planning Session (1st) Held at the University Library of the Mayaguez Campus on February 14, 1974
Roberto Vazquez. 14 Feb 74, 95p OWRT-A-999-PR(2)
Prepared in cooperation with Puerto Rico Dept. of Natural Resources, San Juan.

Keywords: *Water resources, *Puerto Rico, Meetings, Agriculture, Water supply, Industrial water, Sugar crops, Water conservation, Research projects, Water pollution, Water storage, Flood control, Economic development, Virgin Islands, Water demand, Research needs.

The proceedings of a conference and planning session to identify Puerto Rico's water resources problems and research needs are presented. Panel discussions were conducted on water for agriculture, water for development, water for industry, and on water and environmental quality R and D efforts. The agricultural discussion centered on water resource needs for sugar production and on Federal soil and water conservation programs. Economics, flood control, domestic water use problems and research needs, and Corps of Engineers water resources programs were discussed with regard to development. The panel on water and environmental quality discussed water quality problems and research needs, EPA water resources programs, USGS water resources research, and water resources in the Virgin Islands. (Portions of this document are not fully legible)

PB-280 125/6 PC A03/MF A01
Missouri Univ.-Columbia.
Elimination of Pollutants by Utilization of Egg Breaking Plant Shell-Waste
Final rept.
J. M. Vandepopuliere, H. V. Walton, W. Jaynes, and O. J. Cotterill. Mar 78, 47p EPA/600/2-78/044
Grant EPA-S-803614

Keywords: Solid waste disposal, Water pollution control, Industrial wastes, Feeding stuffs, Eggs, Dehydrators, Design criteria, Milling, Cost analysis, Operating costs, Chemical oxygen demand, Chemical composition, Performance evaluation, Microorganisms, Moisture content, *Waste disposal, *Water pollution, Land disposal, *Egg breaking plants, Egg industry, Biochemical oxygen demand.

Egg breaking plants yield an estimated 50,000 tons of waste annually. These wastes are commonly disposed of on land. This method of disposal is becoming more difficult due to the potential for pollution of local water resources. A triple pass rotary drum dehydrator was installed at an egg breaking plant. With appropriate engineering modifications a system for producing egg shell meal from the total egg shell waste from the breaking plant was developed. This meal was utilized as a feedstuff by a local mill and incorporated into a layer diet. This diet was fed to several commercial flocks of cage layers. Appropriate data were collected to determine meal production costs, yield of meal, feed produced, feeding data, and layer flock performance. COD and BOD data were generated to determine the pollution potential of the waste were it not converted to a useful by-product.

PB-280 161/1 PC A08/MF A01
Philippine Council for Agriculture and Resources Research, College.
International Consultation on Ipil-Ipil Research
Jan 78, 164p
Sponsored in part by Agency for International Development, Washington, D.C.

Keywords: Trees(Plants), *Arid land, Developing countries, Meetings, Tropical regions, Plant genetics, Forage crops, Production, Cultivation, Soil properties, Feeding stuffs, Utilization, Wood, Reforestation, Charcoal, *Ipil Ipil, *Plants (Botany), Leucaena leucocephala.

Discoveries on the multi-uses of ipil-ipil (Leucaena spp.) generated worldwide interest in the production of this versatile plant. Originating from Mexico, this species was introduced to various tropical countries especially in Southeast Asia. Undoubtedly, research on ipil-ipil production and its utilization could vary from one country to another and this could influence the formulation and priority listing of research problems areas. Participants from the United States, Mexico, Australia and Taiwan merged their expertise, experiences and ideas with Filipino scientists in an effort to: (1) put together all available information of Ipil-ipil; (2) identify international potentials of the plant for forage, wood and reforestation purposes; and (3) formulate priority research areas and action to fully realize the potentials of the plant. The main objective of the publication of the proceedings of this important conference is to provide a reference for scientists and development workers in countries where ipil-ipil is or could be grown.

PB-280 196/7 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Commodity Economics Div.
The Performance and Economic Feasibility of Solar Grain Drying Systems
Final rept. for 1976
Walter G. Heid, Jr. Feb 78, 39p* Rept no. AER-396

Keywords: Solar dryers, Crop driers, *Solar drying, Drying apparatus, Farm crops, Grain crops, Agricultural engineering, Solar collectors, Cost analysis, Performance evaluation, Agricultural economics, Performance tests, *Crops.

The performance and costs of eight experimental on-farm solar collectors designed to dry corn were studied. Solar drying costs were compared with the costs of owning and operating conventional grain dryers. The eight solar grain drying systems studied include: Rock heat-storage, flat-plate, inflated tube, suspended plate, wraparound, intensifier, air-supported, and multiuse.

PB-280 252/8 PC A07/MF A01
Economic Research Service, Washington, DC. Foreign Development Div.
Development and Spread of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations. Edition 5
Final rept. 1965-75
Dana G. Dalrymple. Aug 76, 133p Rept no. FAER-95
Prepared in cooperation with Agency for International Development, Washington, D.C.

Keywords: *Wheat, *Rice, Agricultural economics, Developing countries, Statistical data, International trade, Cultivation, Asia, Egypt, Iraq, India, Latin America, Philippines.

The use of high-yielding varieties (HYV's) of wheat and rice has expanded sharply in the developing nations in recent years. This report reviews the development of these varieties and documents their yearly spread in statistical terms. Major emphasis is placed on semi-dwarf (1) wheat varieties developed at the International Maize and Wheat Improvement Center in Mexico, and (2) rice varieties developed in the Philippines at the International Rice Research Institute. Semi-dwarf varieties developed in national breeding programs are also included. Data cover the 10-year period from the 1965/66 crop year, when these varieties first came into wide use, through 1974/75.

PB-280 359/1 PC A06/MF A01
Foreign Economic Development Service, Washington, DC.
Survey of Multiple Cropping in Less Developed Nations
Interim rept.
Dana G. Dalrymple. Oct 71, 120p Rept nos. FEDR-12, AGERSF-25
Prepared in cooperation with Agency for International Development, Washington, D.C.

Keywords: *Agricultural economics, Agriculture, Developing countries, History, Cultivation, Yield, Climate, Soils, Fertilizers, Pesticides, Irrigation, Water supply, Rotation, Social effect, Economic development, *Crops, Multiple cropping.

Multiple cropping is the practice of growing more than one harvested crop in sequence on the same piece of land in the course of one year. While an ancient technique, multiple cropping is of current importance because of the promise it holds for alleviating important problems in the less developed nations. Technological advances in developing short-season varieties have (1) broadened the area where multiple cropping is possible, and (2) increased the potential number of crops which may be grown in current multiple cropping areas. But to take advantage of multiple cropping, adequate water control must be available, along with farm chemicals in improved farm management. The report surveys the development in current status of multiple cropping in less developed nations.

PB-280 521/6 PC A02/MF A01
Transport and Road Research Lab., Crowthorne, (England).
Intermediate Public Transport in Developing Countries
Laboratory rept.
P. R. Fouracre. 1977, 23p Rept no. TRRL-LR-772
Also Pub. as ISSN 0305-1293.

Keywords: Urban transportation, Developing countries, Urban development, Statistical data, Municipalities, Vehicles, Services, Great Britain, *Transportation, Minibuses, Taxicabs, Rickshaws.

The Report presents a survey of intermediate forms of urban public transport used throughout the developing world. The controversy surrounding intermediate public transport is discussed and the more important issues and problems are identified. Brief descriptions of some examples are also presented which illustrate how these transportation systems are organized and operated. The purpose of the Report is to elucidate the significant role that intermediate public transport performs in the urban sector of developing countries. This provides the background to further research work being conducted by the Overseas Unit of the Transport and Road Research Laboratory into the efficiency of these various forms of transport. (Copyright (c) Crown Copyright 1977.)

PB-280 662/8 PC A05/MF A01
Agricultural Research Service, Beltsville, Md. Biological Waste Management and Soil Nitrogen Lab.
Sewage Sludge Entrenchment System for Use by Small Municipalities
Interim rept. for Jun 74-Jun 75
J. M. Walker, L. Ely, P. Hundemann, N. Frankos, and A. Kaminski. Feb 78, 83p* EPA/600/2-78/018

Keywords: Land reclamation, Sludge disposal, Municipalities, Ditches, Soil properties, Drainage, Earth handling equipment, Cost estimates, Manpower, Calcium oxides, Odors, Surface water runoff, Monitoring, Viruses, Metals, Nitrogen, Feasibility, *Sewage disposal, Trenching.

A method of disposing of dewatered sewage sludge by entrenching it into soil was developed for small communities. Readily available and relatively inexpensive equipment was used. Included were a tractor equipped with a loader and backhoe, and dump truck or concrete mixer truck. A tractor operator and a truck driver were required. Trenches, dug with the backhoe, were 60 cm wide, 60 cm deep, and 60 cm apart. The time required to entrench 12 tons of dewatered sludge was one hour. The estimated cost of sludge incorporation was less than $15.00 per ton of dewatered sludge. Cost items included equipment, personnel, hauling (64 km round trip), land, drainage monitoring, and cultivation. Reuse of a previously trenched site indicated that about 2 years is the minimum satisfactory time lapse between the first and second entrenchment. Trenching of limed sludge cake can be done without odor or surface water runoff problems. Trenching is most appropriate on low quality land where surface application is not feasible.

PB-281 073/7 PC A08/MF A01
Hawaii Biomass Energy Study Team.
Biomass Energy for Hawaii. Volume II. Sugar Operations
Final rept.
Feb 77, 162p Rept no. HB-2
Also available in set of 4 reports PC E14, PB-281 071-SET

Keywords: Biomass, Hawaii, Sugars, Sources, Sugar alcohols, Process charting, Design criteria, *Sugarcane, Materials recovery, Economic analysis, Electric power generation, Ethanol, Pilot plants, Harvesting, Byproducts, Bagasse, *Fuels, *Alcohols, *Bioconversion, Energy sources, Biological energy conversion.

This volume considers sugar operations as it relates to energy sources. It covers harvesting operations, mill operations, electrical rate structures, alcohol production and general evaluation framework.

PB-281 200/6 PC E20/MF E20
Solar Energy Information Services, San Mateo, Calif.
Survey of the Emerging Solar Energy Industry - 1977 Edition
Justin A. Bereny. c1977, 417p* Rept no. SEIS-77/01
Library of Congress Catalog Card no. 77-71664.

Keywords: *Solar energy, Surveys, Directories, Solar air conditioning, Solar space heating, Solar water heating, Swimming pools, Solar collectors, Concentrating collectors, Flat plate collectors, Wind power, Evacuated tube collectors, Agriculture, Solar thermal power plants, Electric power generation, Photovoltaic conversion, Orbital solar power plants, Ocean thermal energy conversion, Biomass, Marketing, Economics, Legislation, Public utilities, Reviewing, *Wind energy, *Bioconversion, National Energy Plan, Biological energy conversion.

The Survey of the Emerging Solar Energy Industry offers the first comprehensive overview of an exciting new industry that will revolutionize the way we live. It reviews the six major subdivisions of solar technology in considerable depth, i.e., heating and cooling; solar thermal electric; photovoltaics; wind energy; ocean thermal; and bioconversion. It traces the catalytic role of the federal government in spurring the development of solar technology and includes a comprehensive analysis of all state government solar-oriented legislation. The impact of solar technology on the utility industry is examined; all major solar projects of the electric utilities are listed and some of the major demonstration projects are discussed in detail. The research activities of universities, nonprofit organizations and government laboratories are identified by technical area. All leading companies (both publicly and privately owned--including a number of the 'Fortune 500') which are now active in the field are listed in the two Directories that have been incorporated as part of the Survey. Consensus market forecasts are presented and commented upon. The long range financial implications of break-throughs in certain technologies are pointed out. (Copyright (c) 1977 Solar Energy Information Services.)

PB-281 289/9 PC A03/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Agricultural Economics.
Comparative Costs of Conditioning and Storing Corn
Jul 77, 35p* Rept no. AERR-152

Keywords: *Food storage, Corn, Cost estimates, *Drying, Food processing, Treatment, Production, Harvesting, Marketing, Illinois, Statistical analysis, Agricultural Economics, *Grains(Food).

The report illustrates an approach for comparing costs of drying and storage for several alternatives by comparing the total costs of the systems. Costs are calculated for two different farm types--cash grain and livestock--to contrast the relevant systems and the cost items that must be included.

PB-281 335/0 PC A06/MF A01
Corning Glass Works, NY.
Improving the Quality of Work Life: Strategies for Change
Final rept. Jan 74-Jun 75
Michael Beer, and James W. Driscoll. Jun 75, 121p
ASPER/CON-74/0081/A
Contract DL-74-81
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.

Keywords: Quality of life, Job satisfaction, Attitudes, Government policies, Regulations, Social organization, Social welfare, Values, Leadership, Participative management, Emotions, Frustration, Adjustment(Psychology), Innovations, *Employee participation, *Management techniques.

This monograph presents an array of strategies for changing the quality of work life ranging from internal strategies available to individuals and groups inside the organization to means for organizing political and interest groups outside the organization. Also presented are a variety of strategies available to the government. The three stages of the psychological process and their applicability to organizational change are described, as well as the importance of encouraging lower level worker participation in successful change. The boundaries of the change target must be defined (e.g., individuals vs. structure; a combination of power vs. collaboration; market vs. collective or revolutionary; research and development vs. facilitation; centrally planned vs. decentralized; rapid vs. slow; solving problems vs. changing individual dispositions and organizational culture; and growth vs. decrement). The role of the government is seen to be a middle ground between pressure strategies and court actions, on one hand, and facilitation strategies on the other. The strategies employed by agents of change are seen to vary, depending on the point of view, the situation, and the place in society that the change occupies.

PB-281 499/4 PC A02/MF A01
Nevada Univ. System, Reno. Water Resources Center.
Water Conservation Devices: Residential Water Conservation
Water research capsule rept.
1977, 13p W78-06996

Keywords: *Water management, Plumbing, Aerators, Valves, Flow control, Savings, Irrigation, *Buildings, Water saving devices.

A consumer-oriented capsule report highlights findings of research projects funded through the Office of Water Research and Technology which treat the significance, economics, and application of water conservation. Water conservation measures and devices, e.g., plastic bottles, toilet inserts, improved ballcocks, dual flush cycle modifications, water saving toilets, faucet aerators, spray taps, flow control devices, pressure reducing valves, water conserving applications, and landscape irrigation equipment - are briefly described. The economic advantages of water conservation devices are estimated. (Color illustrations reproduced in black and white)

PB-281 714/6 PC A05/MF A01
TRW Systems Group, Redondo Beach, CA.
Research on the Application of Solar Energy to the Food Drying Industry
Interim rept.
Rim A. Kaminskas. Oct 74, 94p NSF/RA/N-74/398
Grant NSF-GI-142944
Prepared by California Polytechnic State Univ., San Luis Obispo.

Keywords: *Food processing, Solar dryers, *Solar drying, Food, Dehydration, Computerized simulation, Solar collectors, Farm crops, Fruits, Vegetables, Dehydrators, Cost estimates.

The tasks performed include: analyzing the produce drying requirements from a technical as well as an economic point of view; synthesizing systems which use solar energy as the source of heat which lead to minimum total system costs (solar plus conventional energy) without sacrifice of product quality; and preparing preliminary designs of solar dehydration systems for construction and tests. Various solar dehydration systems were reviewed and analyzed. Results indicate that a system using solar collectors for preheating the air entering the dehydrator is the most economical and practical way to use solar energy, and that limited use of solar energy for food dehydration may be economically feasible now. Included in the report are: (1) a summary of economical and technical aspects of solar food dehydration; (2) a description of food dehydration technology and an historical account of prior efforts at solar food dehydration; (3) computer simulations of various solar dehydration systems; (4) a description of the basis for selection of an experimental system to be built at California Polytechnic State University; (5) Solar system cost estimates; and (6) technical aspects of solar collector design for food dehydration.

PB-282 082/9 PC A04/MF A01
National Bureau of Standards, Washington, DC. Center for Building Technology.
Methods for Characterizing Adobe Building Materials
Final rept.
James R. Clifton, Paul W. Brown, and Carl R. Robbins. Jun 78, 63p Rept no. NBS-TN-977
Sponsored in part by National Park Service, Washington, DC.

Keywords: Construction materials, Residential buildings, Cohesive soils, Physical properties, Mineralogy, Particle size, pH, Durability, Standards, Plastic properties, Chemical composition, Microscopy, X ray diffraction, Color, Inorganic salts, Electron microscopy, *Building materials, *Adobe.

Methods are described for the characterization of those physical properties and mineralogical features of adobe which appear to have the most significant affect on the durabilities of adobes. These methods include determinations of color, pH, soluble salts, particle size distribution, liquid and plastic limits, and the X-ray 'fingerprint' of adobe. In addition, methods are given for the identification of the mineralogy of adobe soils and for the examination of the microfabric of adobe.

PB-282 233-T PC A22/MF A01
Department of the Interior, Washington, DC.
Reservoirs and Dams
Pavel Peter, Ladislav Votruba, and Ladislav Mejzlik.
1977, 513 Rept no. TT-72-56011

Keywords: *Reservoirs, *Dams, Construction, Structural design, Construction materials, Earth dams, Concrete dams, Gravity dams, Arch dams, *Yugoslavia, Translations.

Describes the structural design and structural properties of dams and reservoirs in Yugoslavia.

PB-282 340/9 PC A07/MF A01
Stanford Univ., CA. Inst. for Communication Research.
Rural Development Programs Among Marginal Farmers in the Western Highlands of Guatemala
Jeremiah O'Sullivan-Ryan. May 78, 147p
Contract AID/1a-c-1118
Sponsored in part by Academy for Educational Development, Washington, D.C.

Keywords: Farm management, Rural sociology, *Guatemala, Farms, Disadvantaged groups, Quality of life, Farm processing, Development, Surveys, Information, Planning, Technical assistance, Developing countries, Low income groups, Training programs, *Agricultural extension services, Adult farmer education.

The general purpose of the study was to examine the role of information and extension services in promoting change in the lives of subsistence peasants in the Highlands of Guatemala. The study was also intended to contribute to an understanding of the social and economic reality within which the Mayan Indian carries on his system of subsistence agriculture. This study concludes that a program of information and credit cannot and will not change significantly the lives of subsistence farmers in the Highlands. Agriculture extension services presently reach a group of relatively well-off farmers and even if these services were extended, the use that the small subsistence farmers can make of them is structurally limited; the changes the program may achieve through the introduction of new technological practices will not produce significant improvements in the lives of the subsistence poor.

PB-282 349/0 PC A04/MF A01
Washington Univ., St. Louis, Mo. Center for the Biology of Natural Systems.
Determination of Optimal Well Capacities for Continuous Irrigation Programs
A. K. Sanghi, D. Johnson, and G. Kuepper. Jan 78, 55p NSF/RA-780017
Grant NSF-AER7717031

Keywords: Corn plants, *Irrigation, Water consumption, *Agricultural economics, Mathematical models, Soil water, Ground water, Evapotranspiration, Yield, Revenue, Production, *Water management, *Water wells, Water requirements, Great Plains Region(United States).

This report applies a model of crop response to irrigation to corn production in the Great Plains under center pivot irrigation. Net revenue is calculated for various well output levels chosen in accordance with the crop's water requirement during various critical growth periods. The effect of a water deficit on crop yield is calculated in terms of the water holding capacity of the soil, the amount and timing of water applications, and pan evaporation rate.

PB-282 366/4 PC A05/MF A01
South Dakota State Univ., Brookings. Water Resources Research Inst.

Water Movement through Soils and Plants as Related to Physical and Meteorological Conditions
Completion rept.
Maurice L. Horton. Mar 78, 80p OWRT-A-035-SDAK(2)
Contract DI-14-31-0001-3542

Keywords: Farm crops, Stress(Physiology), *Water supply, *Irrigation, Evapotranspiration, Temperature, Oat plants, Grain sorghum plants, Soil water, Moisture content, Plant tissues, Water loss, Equations, Photosynthesis, Field tests, Soil water plant relationships, Plant canopies.

One important problem for irrigated agriculture is deciding when to irrigate and how much water to apply. Water management decisions in irrigation are made according to the calendar, soil conditions, plant conditions, environmental conditions, or the reading obtained using an instrument as, for example, the tensiometer. Since the temperature of bodies, such as plants, is responsive to the supply of water for evaporation and to environmental conditions, temperature may become a useful tool for determining the onset of water deficits and the need for irrigation. The study investigated the movement of water within the root zone, the use of surface temperature in equations for estimating evapotranspiration, and the nature of plant response to water deficits. The field study employed soil, plant and meteorological measurements. Oat plants showed a progressive decline in relative leaf water content with an increase in water stress imposed by sheltering the plants from natural rainfall.

PB-282 460/5 PC A03/MF A01
World Water Resources, Inc., Bethesda, Md.
Rural Potable Water Chlorination
William E. Hanford, Jr, and Alfred Long. 1970, 41p
Rept no. WWRI/B-78/1
Sponsored in part by Agency for International Development, Washington, D.C. Office of Science and Technology.

Keywords: Rural areas, *Water treatment, Developing countries, Chlorination, Purification, Maintenance, Gravity drainage, Chlorinators, Performance, Specifications, *Water quality, Appropriate technology.

The paper addresses two questions: (1) What is the most desirable form of sanitizing chemical for use in rural water supplies; and (2) What is the best overall means of getting this sanitizing agent into rural water supplies. Several chemicals and hypochlorinators are described and evaluated. In conclusion, a low-cost, dependable feeding device suitable for use in disinfecting marginal waters in the rural areas of developing countries is presented. The operation and maintenance of this device is easy for the unskilled labor in these areas; no sophisticated power source is needed to provide continuous, automatic operation; the device uses a readily available, commercial chlorine chemical that can be economically shipped, stored, and used at these points of need. An appendix is also included giving technical specifications and performance data.

PB-282 531/3 PC A15/MF A01
Minnesota Univ., Minneapolis. Center for Study of the Physical Environment.
Biomass Utilization in Minnesota
Research rept. Mar 75-Sep 77
Perry L. Blackshear, Jr, Roger Aiken, and Roger A. Peterson. Nov 77, 331p
Sponsored in part by Minnesota Pollution Control Agency, Roseville. Div. of Solid Waste.

Keywords: Plants(Botany), Wood, Biomass, Minnesota, Anaerobic processes, *Methane, Residues, Soil properties, Utilization, Substitutes, Pyrolysis, Fuels, Design criteria, Ammonia, Sugars, Assessments, Cost analysis, Feasibility, Vaporizing, *Bioconversion, *Agricultural wastes, *Waste recycling, *Animal wastes, Biological energy conversion, *Manures, Energy sources, Manufactured gas, Synthetic fuels, Solid wastes.

Contents:
- Pyrolysis;
- Crop residues as energy sources--assessing the cost and energy feasibility of direct firing;
- Cost and energy assessment of alternate uses of crop and timber residues in Minnesota;
- Anaerobic digestion of crop residues for methane generation as an adjunct to farming;
- Energy recovery on the farm by anaerobic digestion of animal manures;
- Ammonia volatilization from animal manures;
- Effect upon soil properties of utilization of plant residues for fuel energy;
- Waste cellulose conversion to sugars by cellulose enzymes.

PB-282 650/1 PC A12/MF A01
Florida Inst. of Tech., Melbourne.
Solar Cookers for Haiti, A Feasibility Study
Final rept. Jul 76-Sep 77
Thomas E. Bowman, James R. Sharber, and Joel H. Blatt. Dec 77, 273p
Contract AID/ta-C-1333

Keywords: *Solar cookers, *Haiti, Solar cooking, Design, Performance evaluation, Photographs.

The objectives of the study were to assess the feasibility of applying solar cookers extensively in rural Haiti, and to present a preliminary design for a solar cooker based on Haitian requirements. Two such designs are presented herein. (Color illustrations reproduced in black and white)

PB-282 703/8 PC A05/MF A01
Small Business Administration, Washington, DC.
The Study of Small Enterprise in the Economy: Summary
Jun 76, 79p

Keywords: Federal assistance programs, Businesses, History, Economic impact, Technology innovation, Management, Technical assistance, Financing, Regulations, Planning, National government, *Industrial development, *Small businesses, Small Business Administration.

Contents:
- Private enterprise in the economy--Historical background;
- The problems inherent in a small business;
- The national interest in small business;
- The Small Business Administration--Agency mission and programs;
- A more effective program for the future--Credit and equity funding for small business enterprises;
- Innovation and new business formation;
- Government procurement regulations and practices;
- Management assistance;
- Minority enterprises and their special problems.

PB-282 705/3 PC A06/MF A01
Small Business Administration, Washington, DC. Office of Management Assistance.
Starting and Managing a Small Business of Your Own
Wendell O. Metcalf. 1973, 103p Rept no. STARTING AND MANAGING SER-1/3 ED

Keywords: Businesses, *Management techniques, Planning, Financing, Purchasing, Prices, Management methods, Personnel management, Insurance, Records management, Regulations, Laws(Jurisprudence), Taxes, *Small businesses, Franchising.

Contents: So you are thinking of going into business (Are you the type; What business should you choose; What are your chances of success; What will be your return on investment); Starting a new business (How much money; Where to get the money; Should you share ownership with others; Where to locate); Buying a going business (What are the advantages and disadvantages; How much to pay); Investing in a franchise (What is a franchise; What are the advantages and disadvantages; Where to look for franchise opportunities; How to evaluate an opportunity); Managing your business (What should you know about buying; What about pricing; What selling methods should you use; What are the problems of selecting and training personnel; What other management problems will you face; How much record keeping); Looking into special requirements (To what laws and regulations will you be subject; How about taxes; What types of insurance); Setting goals and keeping up to date (How to set goals; How to keep up to date); Checklist for starting a business.

PB-282 707/9 PC A03/MF A01
Small Business Administration, Washington, DC. Office of Management Information and Training.
Management Audit for Small Manufacturers
John B. Kline. 1977, 49p* Rept no. SMALL BUSINESS MANAGEMENT SER-29

Keywords: Manufacturers, Businesses, Management, Auditing, Guidelines, Production, Operations, Accounting, Budgeting, Regulations, Taxes, Insurance, Financial management, Purchasing, Marketing, Inventory control, Prices, Personnel management, *Management techniques, *Small businesses, Management audit.

The activities of management require frequent evaluations designed to reveal the operating and financial condition of a business. The best known and most formal of these are prepared by a qualified accountant. These audits are prepared according to a format which is well-known and acceptable to those concerned with financial condition of businesses. Such statements, however, are not adequate to provide what management needs to develop efficient methods of control and direction for the operational activities of a business. To facilitate operational control, it's desirable to provide ways in which management can (1) identify activities that should be observed, (2) establish standards of measurement, and (3) provide suggestions for making improvements. The management audit is an outline for self-appraisal in which the owner-manager answers a series of questions about typical business operations. The material in this booklet was designed for a small manufacturer; each area is applicable to manufacturing activity. Overall, however, the technique could be applied to almost any enterprise in which functional operations are a critical factor in efficiently producing goods or services. The following areas are covered. production and operations, plant and equipment, accounting, budgeting and expense control, cash management, management and organization, laws, regulations, and taxes, risk and insurance, credit management, systems and procedures, outside consultants and resources, inventory control and management, purchasing, marketing and sales promotion, work and time standards, pricing, and research and development.

PB-282 708/7 PC A07/MF A01
Small Business Administration, Washington, DC. Office of Management Information and Training.
Financial Control by Time Absorption Analysis--A Tool for Profit Control
Cole D. Neff. 1975, 143p Rept no. SMALL BUSINESS MANAGEMENT SER-37

Keywords: Businesses, Financial management, Control, Profits, Estimates, Losses, Prices, Manufacturing, Services, *Management techniques, *Small businesses.

Time-absorption analysis is a technique that can be used by all types of businesses for profit control. In this booklet, the author uses a step-by-step approach to introduce this concept and show the way for its adaptation to a particular business. The following topics are discussed: A step toward higher profits; Uses of the new method; General principles; Detailed procedure for the time-absorption method; Profit or loss estimation; Setting prices; Financial analysis of the business; Good financial control; Retail-wholesale business; Manufacturing; Service business; and Construction and contracting.

PB-282 721/0 PC A04/MF A01
Small Business Administration, Washington, D.C.
The Starting and Managing Series. Volume 4. Starting and Managing a Small Bookkeeping Service
Charles H. Sevin. 1962, 71p

Keywords: Accounting, Businesses, *Management training, Services, Operations, Planning, Organizing, Guidelines, *Small businesses, Bookkeeping services.

This series is designed to meet a need of prospective small businessmen as well as new and experienced ones for basic information on particular types of business. In the current volume, both newcomer and veteran should find something of value. The pages which follow confront the newcomer with prestarting problems, many of which he may not have realized existed. But more significant even than the physical activities he must take is the important aspect of inward looking.

He must scrutinize his own capacities and ask searching questions about himself and about his fitness for leadership. It is important for him to find out--before he strikes out on his own--whether his personality, physical energy, ability to work with business leaders, and faculty for planning would make him at least potentially successful at managing a business of his own. Starting and Managing a Small Bookkeeping Service is designed to spell out the facts about this particular type of endeavor so the reader himself can decide if he is suited to it and it to him. Both the advantages and disadvantages are discussed. This booklet should have a special appeal to prospective owner-managers of a small bookkeeping service. They will find in it a guide to operating conditions in that field--one that spells out for them both common problems and pitfalls as well as potential rewards. Those already in the enterprise should also profit from reading it. First, because some of the topics discussed may remind them of the need to follow certain management practices. Second, because some portions of this book discuss the broad area of administration and long-range planning. While important to the newcomer, this is of greatest immediate significance to the person already in the business.

PB-282 722/6 PC A06/MF A01
Small Business Administration, Washington, DC.
The Starting and Managing Series. Volume 24. Starting and Managing a Small Shoestore
William A. Rossi. 1974, 109p

Keywords: Businesses, Management, Planning, Purchasing, Manufactures, Imports, Financial management, Operating costs, Sales, Profits, Inventory control, *Management planning, *Footwear, *Small businesses, Small stores, Retail stores, Shoe stores.

Contents:
- Are you ready;
- Makeup of the footwear industry;
- What kind of store;
- Selecting the right location;
- Financing the store;
- Merchandise buying and inventory control;
- Markons and markdowns;
- Operating costs and expenses;
- Profits and profits control;
- The selling program;
- Store management;
- Launching the new store;
- For further information.

PB-282 725/1 PC A03/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series No. 4. Third Edition. Improving Material Handling in Small Business
1969, 44p

Keywords: Businesses, *Materials handling, Management, Equipment, Storage, Cost engineering, Packaging, Industrial engineering, Plant layout, Workplace layout, Efficiency, Organizing, *Management techniques, *Small businesses.

The booklet discusses the basics of the handling function, and describes the array of equipment available and its capabilities. It tells how to lay out a plant's workplaces and to organize its labor to develop an efficient handling system; it describes some techniques for assuring that the investment in the equipment yields a profit. The following topics are discussed: What is material handling; Selecting material handling equipment; Organizing for material handling; Analyzing material handling problems.

PB-282 726/9 PC A04/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series No. 15. A Handbook of Small Business Finance
Jack Zwick. 1975, 69p

Keywords: Businesses, Financial management, Handbooks, Management planning, Assets, Accounting, Working capital, Financing, National government, *Management techniques, *Small businesses, Small Business Administration, Venture capital, Business loans.

Contents:
- What is financial management;
- Financial statements;
- Ratio analysis of financial statements;
- The different types of financing;
- Unsecured borrowings for working capital;
- Secured working capital financing;
- Secured growth capital financing;
- The Small Business Administration;
- SBIC's and other sources of venture capital.

PB-282 727/7 PC A03/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series No. 3. Third Edition. Human Relations in Small Business
Martin M. Bruce. 1969, 42p

Keywords: Businesses, Personnel management, Industrial relations, Personnel development, Motivation, Morale, Appraisals, Selection, Incentives, *Management Techniques, *Small businesses.

The subject of human relations is as old as history. In the business world, human relations involves finding and selecting a working staff, developing workers, and guiding and motivating them in the direction of gaining management's goals. Well-planned action is much more valuable than a problem-solving approach. Worker-manager relations become more important than ever. It is the supervisor's job to set the climate for the work group. Any man who manages a plant gets the work done through people. The key to accomplishing this lies at least in part in the broad and complex field called human relations, which is the subject of this booklet. The topics discussed are the following: Human relations in small business--why and how; Worker morale; Starting right--personnel selection; Orientation and induction; Training; Continuing personnel relations.

PB-282 730/1 PC A04/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series Number 31. Third Edition. Management Audit for Small Retailers
John W. Wingate, and Elmer O. Schaller. 1977, 67p*

Keywords: Businesses, Management, Auditing, Guidelines, Public relations, Personnel management, Supervision, Inventory control, Budgeting, Questionnaires, Planning, Purchasing, Prices, Publicity, Financial management, Insurance, Records management, Taxes, *Management techniques, *Small businesses, Management audits, Small stores, Retail stores.

The booklet is designed to meet the needs of the small owner-manager. The approach used is a do-it-yourself technique. The manager does the examining; the answers are private; and none of the intimate facts about the business will be revealed to an outsider. However, it is advisable to compare this self-appraisal with the views of others in whom the manager has confidence. In the present audit, there are 170 questions. The manager's answers to them will give a good indication of how well he or she is doing the planning, organizing, directing, coordinating, and controlling that the business needs. Moreover, the questions the manager cannot answer affirmatively should direct attention to areas which previously have not been given much thought. And, in most instances, from this attention will come the stimulation needed to develop good management practices for these areas. The questions have been divided into 18 sections to cover the essential parts of retail management. These sections are the following: Introduction to the management audit, a look at yourself and your ability to grow, customer relations, personnel management and supervision, merchandise inventory control, budgetary control and productivity, buying, pricing, advertising and promotion, display, equipment and layout, cash and finance, credit, insurance, accounting records, taxes and legal obligations, planning for growth, and publications dealing with managing a retail business.

PB-282 731/9 PC A05/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series Number 36. Training Salesmen to Serve Industrial Markets
Kenneth Lawyer. 1975, 91p

Keywords: *Marketing, Personnel development, Businesses, Sales, Manufacturers, Coordination, Management, Specialized training, *Management training, *Training, *Small businesses.

The booklet discusses the role of sales in the overall marketing program of a small manufacturer. It offers suggestions that salesmen can use in servicing industrial customers and provides the owner-manager with specific material to use in a training program. This booklet is issued as part of the management publications program of SBA's Office of Management Information and Training. It discusses the following topics: The successful small firm is customer oriented; Coordinated marketing, for profit; The salesman's job; Training your salesmen; Buying is decision-making--Selling is sound guidance; Selling as a service.

PB-282 733/5 PC A02/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series Number 1. Third Edition. An Employee Suggestion System for Small Companies
Donald Wilhelm, Jr, and C. W. Ufford. 1964, 23p

Keywords: Businesses, Management, Employees, Recommendations. Improvement, Management planning, Opinions, *Management techniques, *Small businesses, Employee suggestion systems.

Suggestion systems are for everyone. Small companies and large, employers and employees, even customers--all benefit. For the small-business manager, a suggestion system can cut costs, increase efficiency, and build better employer-employee relations. For employees, it can bring a chance to earn extra money and, perhaps more important, the realization that they are members of the team--that the company is interested in the total contribution they can make and not just in their capacity as producing machines. For customers, suggestion systems mean better products or services. 'An employee suggestion system for small companies' explain the basic principles for starting and operating a successful suggestion system. It warns of various pitfalls to be avoided and gives examples of suggestions submitted by workers through company suggestion systems. The following areas are discussed: Theory of the suggestion plan; Essentials of a good suggestion system (Appoint an administrator, Appoint a suggestion committee, Employ task teams; Provide suggestion boxes and bulletin boards; Provide suggestion blanks or forms; Provide suitable initial awards; Make sure of followup; Provide additional awards); Additional pointers (Files; Complaints; Duplicate suggestions; Unclaimed awards; Delayed adoption of ideas; Eligibility; Ideas from outside sources; Employee buildup of ideas; Patents; Thought provokers; Advice and publications); Installing and operating the system; Simplifications for the very small company; Problems in 'selling' the suggestion plan; What to expect-- Periodic reselling of the plan.

PB-282 739/2 PC A03/MF A01
Small Business Administration, Washington, DC.
Small Business Management Series No. 32. Financial Recordkeeping for Small Stores
Robert C. Ragan. 1976, 42p

Keywords: Businesses, Financial management, Records management, Taxes, *Management techniques, *Small businesses, Small stores.

The author has designed this basic recordkeeping system primarily for the small store owner-manager or prospective owner whose business does not justify hiring a trained, full-time bookkeeper. This system will accomplish three purposes: (1) Maintain a record of all transactions of the business; (2) protect the assets of the business from errors, fraud, and just plain carelessness; and (3) provide a basis for business planning by showing the results of past decisions and furnishing the facts needed for future decisions. But this system will not accomplish these purposes automatically. To be fully useful, a bookkeeping system must be adapted to the needs of the individual business. And then, it can only be as useful as it is up to date and accurate. The information it records must be applied, not just in the preparation of tax returns, but in the day-to-day operation of the business. The following topics are discussed: The why, what, and how of records (Records--for the government or for yourself; Building materials for your recordkeeping system; Methods and equipment); The money comes in--and goes out (The change and petty cash fund, The daily summary of sales and cash receipts, Writing the checks); Lining up the records (The sales and cash receipts journal, The cash disbursements, purchases, and expense journal); Getting set for monthly financial statements (Reconciling your bank statement, Recording accounts payable, Merchandise inventories); The score--win or lose, and

how much (The profit-and-loss statement, Departmental operating records); The shape you're in (The general ledger and the balance sheet, Steps to be taken at the end of the year); The absentee asset--accounts receivable (Recording accounts receivable, Aging your accounts receivable, Accounting for bad debts); Some special cash receipts situations (Return sales and refunds, Making purchases from cash receipts, Cashing customers' checks, Redeeming coupons); Depreciation and disposal of plant assets (Computing depreciation of property and equipment, Recording the purchase and depreciation of plant assets, Recording the sale, trade-in, or junking of plant assests); Here they come--taxes (Collecting and recording sales taxes, Payroll records and payroll taxes, Income and self-emloyment taxes).

PB-282 746/7 PC A13/MF A01
Indiana Univ. at Bloomington. International Development Research Center.
Systems Tools for Project Planning
Peter Delp, Arne Thesen, Juzar Motiwalla, and Neelakantan Seshardi. 1977, 286p* Rept no. ISBN-0-89249-021-7
Sponsored in part by Midwest Universities Consortium for International Activities, Inc.

Keywords: Project planning, Systems analysis, Systems management, Project control, Flow charting, Critical path method, Management methods, Matrix games, Planning, Evaluation, Gaming models, Computerized simulation, Histograms, Forecasting, Benefit cost analysis, Cost effectiveness, Developing countries, *Management techniques, Planning programming budgeting.

Designing development projects requires some form of systems approach. If any plan is to succeed, the factors that will probably determine the outcome must be identified, and their relationships must be established. There will always be surprises as implementation proceeds, for our ability to predict and control the future is limited. The object of planning and design is to keep those surprises at a minimum. A systems approach, properly used, can serve this aim. The examples draw on a broad range of problems and situations confronting project planners in the development fields, ranging from education and health to agriculture and economic policy. Most of the examples refer to a developing country which (for convenience) has a widely varying climate and diverse ecological zones. The population is mostly agrarian. The tools included in this volume fall into a number of categories--generating ideas; assessing qualitative factors; defining objectives; describing complex relationships; analyzing complex processes; accounting for alternative outcomes; forecast and prediction; analyzing projects; and planning, controlling, and evaluating projects. Clearly, many techniques could be included in more than one category. For example, computer simulation models could be used for the last six purposes listed. It is presented in analyzing complex processes because that is the most basic use of computer simulation. Each tool is designed to stand alone as a source of information for a decision maker, as an aid to the analyst, and as a catalyst for multidisciplinary design teams. The tool description provides a basis for action and/or the evaluation of actions by others.

PB-282 835/8 PC A15/MF A01
Midwest Universities Consortium for International Activities, Inc.,
Institution Building: A Source Book
Final rept.
Melvin G. Blase. 1973, 331p
Contract AID/csd-3392

Keywords: *Technical assistance, Developing countries, Bibliographies, Management planning, Agriculture, Community development, Businesses, Education, Government, Commerce, Organizations, *Industrial development, Institution building, Public administration.

Contents: A descriptive bibliography of the central literature on institution building--The essential core of the literature; Selected contributions to the literature (Case studies classified according to type of institution--Agriculture, Business Administration, Community development, Cooperatives, Educational institutions, Government operations, Planning organizations, Public administration, Trade union, Youth), Cross-sectional analysis of institutions, Other relevant literature (Analytic reviews, Conference proceedings, Methods of analysis, Position papers, General), Supporting literature; Key concepts and definitions (Institutions and the development process, Divergent definitions of institutions, Institutions, values, and ideology, Institution building process, Institution variables, Linkages and transactions, Institutionalization, Technical assistance in institution building, Systems, strategies, and tactics, Miscellaneous concepts and definitions; Relationships among concepts (Micro and macro aspects of institution building).

PB-282 836-T PC A02/MF A01
Indiana Univ. at Bloomington. International Development Inst.
Approaches to the Design of Agricultural Development Projects. A Program of Advanced Studies in Institution Building and Technical Assistance Methodology Design Study
Walter Schaefer-Kehnert. Jan 77, 18p Rept no. ISBN 0-89249-023-3

Keywords: Developing countries, *Agricultural economics, Project planning, Research projects, Economic factors, Objectives, Translations, West Germany, Methodology, *Management planning.

The author identifies three possible approaches to the design of agricultural development projects--three different ways of specialization, by sector, by function, and by area. As a necessary step in responding, the author presents a set of six factors which appears to have important effects upon the chances for a project's success. The result is a cogent set of statements to guide those who would design projects, and do so with the opportunity to choose from among alternative arrangements.

PB-282 839/0 PC A13/MF A01
Indiana Univ. at Bloomington. International Development Research Center.
Designing and Managing Basic Agricultural Programs
Earl M. Kulp. 1977, 289p Rept no. ISBN-0-89249-018-7
Sponsored in part by Midwest Universities Consortium for International Activities, Inc., and Agency for International Development, Washington, DC.

Keywords: Management, *Agricultural economics, Developing countries, Mathematical models, Systems analysis, Yield, Objectives, Marketing, Supply(Economics), Linear programming, Manpower, Decision making, Income, Optimization, Improvement, Financing, Project planning, *Management planning.

Distilling the experience of those countries which have successfully modernized basic agriculture, this volume presents a new delivery system strategy and the techniques for managing it. The system of concern is the whole complex of basic analytical concepts, policy, strategy, tactics, institutions, and procedures for providing all the necessary services that will induce and enable peasants to modernize, or to change from peasant to farmer. This volume presents essential management tools, the concepts underlying these tools, and a series of quantitative techniques and fairly rigorous decision tools.

PB-282 860/6 PC A13/MF A01
Indiana Univ., at Bloomington. International Development Research Center.
Science Development: The Building of Science in Less Developed Countries
Michael J. Moravcsik. 1976, 287p Rept no. ISBN 0-89249-008
Sponsored in part by Midwest Universities Consortium for International Activities, Inc., and Agency for International Development, Washington, DC.

Keywords: Developing countries, Technology, Education, Manpower, Research, Policies, Planning, Government, Scientists, Development, *Science policy, *Research and development, State of the art.

The book is concerned with the deliberate and systematic development of scientific capability in developing countries. The book is a 'summary of the state of the art in science development,' a collection, distillation, and generalization of an accumulated body of experience. It appears to be the first book on the subject, though the literature on science development has become quite extensive. A valuable feature of this book is the list of 500 publications on various aspects of science development, many of them summarized in the text. Moravcsik argues that science must be developed in developing countries if the desirable goals of a higher standard of living, an independent economy, political and military power, and liberation from a subsistence existence are to be achieved. Domestic science education is, in his opinion, the best way to produce the needed scientists, with strong emphasis on quality as well as quantity. Special attention must be given to retaining competent scientific manpower. He asserts that scientific communication is perhaps the most important tool of science, and that the international scientific communication system is strongly biased against developing countries. There are internal problems of communication as well: while many developing countries have the correct ratio of basic to applied research, connections between the two are not developed. Hence the effectiveness of each, particularly of applied research, is greatly lessened. He maintains that improvement of quality in applied research and the establishment of links between basic and applied should be the primary targets of attention. The best method of allocating funds, he says, is a mixture of individual grants based on merit and institutional grants distributed equally. In developing countries much applied research is poorly done. However, some applied research is well done but has no effect: the linkages between the research and production sectors are so poor that research results never reach the places where they are needed. What are the institutional requisites of science. How can the linkages be established which will enable scientists to participate effectively in their country's development. Presented are a great deal of information on science development, a set of recommendations, and an enthusiastic call for involvement.

PB-282 941/4 PC A09/MF A01
Tanzania National Scientific Research Council, Dar es Salaam.
Workshop on Solar Energy for the Villages of Tanzania, Held at Dar es Salaam, Tanzania on August 11-19, 1977
1978, 177p
Contract AID/csd-2584
Sponsored in part by National Research Council, Washington, DC. Board on Science and Technology for International Development.

Keywords: *Solar energy, *Tanzania, Meetings, Solid waste disposal, Biogas process, Wind power, Windmills, Photovoltaic power generation, Electric power generation, Water supply, Solar stills, Solar drying, Refrigerating, Solar cooling systems, Utilization, Reviews, Wind energy, *Bioconversion.

The seminar/workshop's purposes were: (1) to review the state-of-the-art of small-scale solar energy devices, including both the technical and economic aspects of their utilization; and (2) to suggest short- and long-range projects using solar devices in the villages, with particular emphasis on recommendations for implementation.

PB-283 018/0 PC A05/MF A01
Clark Univ., Worcester, MA. Graduate School of Geography.
Handbook of Water Conservation Devices
Stephen L. Feldman. Nov 77, 84p* NSF/RA-770526
Grant NSF-APR76-19369

Keywords: Plumbing, Water conservation, *Water supply, Handbooks, *Pipes(Tubes), Water meters, *Water management, Control systems, Washing machines, Kitchen equipment and supplies, Irrigation, Water consumption, Aerators, Performance evaluation, Circulation, Water saving devices, Toilets, Consumer products.

Current water supply problems and projected near future shortages in the United States have created interest in methods of reducing domestic water demand. These techniques include education of consumers to alter their water using behavior, metering, pricing, and or installation of water saving devices, which is the subject of this handbook. The devices included are (1) water saving toilets and accessories, waterless toilets, bidets, and urinals; (2) flow limiting devices for faucets and showers; (3) alternative plumbing systems; (4) domestic recycling systems; (5) piping insulation; (6) dishwashers and clotheswashers; and (7) lawn and garden irrigation control systems. A description of each type of device is followed by a list of manufactur-

ers of that device, and any special details that may pertain to their particular versions. The handbook is intended to guide consumers in product identification and selection.

PB-283 147/7 PC A08/MF A01
Human Interaction Research Inst., Los Angeles, Calif.
Improvement in Quality of Work Life and Productivity: A Joint Venture Between Management and Employees
Final rept.
Edward M. Glaser, Carrol E. Izard, and Mary Faeth Chenery. 2 Jul 76, 169p DLMA-92-06-72-27
Grant DL-92-06-72-27

Keywords: *Productivity, Quality of life, Attitudes, Job analysis, Job satisfaction, Program effectiveness, Industrial management, Leadership, Manpower utilization, Motivation, Incentives, Performance, Personnel management, Placement, Skilled workers, Unskilled workers, Supervisors, *Management techniques, *Labor relations, Quality of worklife.

The study was designed to assess the relationship between Quality of Worklife (QWL), productivity, and job satisfaction. The report describes developmental events, prevailing conditions, consulting interventions, and outcomes. An analysis is presented of what seems to have worked and what has not. At the time of the project, the corporate organization was beset by financial problems and those related to adjustment to new ownership; the branch plant was overwhelmed by start-up technical difficulties. Nevertheless, positive outcomes can be reported in terms of satisfactorily meeting production goals, ego-involvement of the workforce, comparatively low absenteeism rate, and the plant's survival of the eroding frustrations of start-up delays. Learnings and recommendations have been drawn from the experience in order to provide indications for future efforts to achieve enriched OWL and organizational effectiveness.

PB-283 249/1 PC A04/MF A01
Woods Hole Oceanographic Institution, MA.
Investigative Research and Management of Effluent from Secondary Waste Water Treatment Utilizing a Marine-Aquaculture System for the Removal of Inorganic Nutrients
Final rept. 15 May 74-30 Apr 75
John H. Ryther. 1975, 60p NSF/RA/E-75-264
Grant NSF-GI-43384

Keywords: *Aquaculture, *Waste water reuse, *Sewage treatment, Pilot plants, Oysters, Lobsters, Flatfishes, Algae, Nitrogen, Shrimps, Removal, Growth, Performance evaluation, Tertiary treatment.

A combined waste recycling-marine aquaculture system capable of complete nitrogen removal from treated domestic wastewater has been developed and tested on a pilot-plant scale over a one-year period. Effluent from secondary sewage treatment, mixed with seawater, is used to grow unicellular marine algae in large, continuous-flow, outdoor mass cultures. Harvest from the algae cultures is fed to oysters and other filter-feeding bivalve molluscs and to secondary crops of flounder or lobsters. Dissolved wastes produced by the animals are assimilated by cultures of commercially valuable seaweeds. Successful cultures of unicellular algae, mostly diatoms, and seaweeds have sustained over long periods of time. Bivalve mollusc culture was unsuccessful during the first year of operation. An alternative nitrogen-removal system consisting only of seaweeds fed a continuous flow of secondary sewage effluent mixed with seawater has also been evaluated.

PB-283 768/0 PC A04/MF A01
Biospherics, Inc., Rockville, MD.
Bioconversion of Saline Water. Phase I Report
31 Mar 78, 58p P-7705-25, NSF/RA-780066

Keywords: Desalting, *Algae, Feasibility, Economics, Sodium, Cultures(Biology), Chlorides, Salinity, pH, Concentration(Composition), Sludge, Temperature, Energy conservation, *Desalination, *Bioconversion, Sewage sludge, Procedures, Phenol/dinitro, Toxic substances.

Experiments were conducted on the use of algae for removal of salt from water in an attempt to develop an economically feasible, low energy method for the conversion of saline water. Primary project objectives are: (1) to undertake a literature search; (2) to select and obtain algal cultures; (3) to culture algae in sufficiently large volumes for test purposes; (4) to determine suitable methods for evaluation of media and cellular sodium concentrations; and (5) to test various environmental factors for their effect on algal sodium uptake and excretion. The literature search was completed, stock algal cultures were obtained and grown in relatively large culture volumes. Techniques for monitoring cell sodium levels were evaluated for the most efficient means of removing external sodium and for digestion of the cells prior to sodium analysis. Environmental changes indicated in the literature search and which could be easily manipulated were made in attempts to induce uptake/release of sodium from algal cells. Factors selected for experimental manipulation were: pH, salinity, temperature, light vs. dark conditions, addition and depletion of energy sources, addition of toxic compound, and addition of sewage sludge. No significant uptake or excretion of sodium or chloride were obtained in the algal species studied when the selected environmental manipulations were made, with the exception of a possible uptake of sodium when the algal culture was studied in the presence of activated sewage sludge.

PB-283 811/8 PC A12/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Plant Pathology.
An Annotated Bibliography of 'Macrophomina phaseolina' 1905-1975
Ankar D. Dhingra, and James B. Sinclair. Jul 77, 251p*
Prepared in cooperation with Universidade Federal de Viscosa, Minas Gerais (Brazil).

Keywords: Bibliographies, Plant diseases, *Fungi, Abstracts, Parasitic plants, *Plants(Botany), Soybean plants, Farm crops, Trees(Plants), Plant pathology, Plant ecology, Macrophomina phaseolina, Glycine max.

The bibliography was begun in 1970 as a working file of the literature concerned with charcoal rot of various plants, particularly soybean (Glycine max (L.) Merr.) and the causal fungus, Macrophomina phaseolina (Tassi) Goid. Only recently, except for its occurrence on bean (Phaseolus vulgaris L.) and jute (Corchorus capsularis L.), was the importance of this fungus as a serious pathogen of crop plants and trees fully appreciated. Because this fungus attacks under environmental conditions usually nonfavorable for plant growth, it was considered a weak parasite or merely a saprophyte causing little or no significant damage. However, its seriousness on economic plants throughout the world was more fully recognized during the 1970's. There is now increased interest in the study of this fungus as a plant pathogen. Therefore, the principal purpose of this bibliography is to provide a handy reference to mycologists and plant pathologists interested in this fungus and the diseases it causes.

PB-283 929/8 PC A08/MF A01
National Bureau of Standards, Washington, D.C. Office of International Relations.
Standardization in Support of Development. Proceedings of a Seminar, Held at the National Bureau of Standards, Gaithersburg, Maryland on October 17-18, 1977
H. Steffen Peiser, and John A. Birch. May 78, 172p
Rept no. NBS-SP-507
Library of Congress Catalog Card no. 78-7249. Prepared in cooperation with Agency for International Development, Washington, D.C., American National Standards Inst., New York, and American Society for Testing and Materials, Philadelphia, Pa.

Keywords: Developing countries, *Standardization, Measurement, Meetings, Engineering, Industries, Quality control, Argentina, Bangladesh, Bolivia, Egypt, Ghana, Indonesia, Iran, Kenya, Korea, Philippines, Thailand, National Bureau of Standards, Government programs.

The National Bureau of Standards held a two-day Seminar in an effort to appraise the benefits derived form six years of a cooperative program with developing countries designed to improve their standardization and measurement services. With financial support from the Agency for International Development, participants came from Argentina, Bangladesh, Bolivia, Egypt, Ghana, Indonesia, Iran, Kenya, Korea, the Philippines, and Thailand; from regional and international organizations; from key U.S. standards writing bodies; and from industries, professional societies and government in the United States. The papers presented and the discussions were organized around the session titles: Six Years of National Bureau of Standards and Agency for International Development Programs, and Standardization in the U.S.A.--A Resource for Development. It was concluded that the developing countries concerned with this program had benefited in a variety of ways from the standards surveys and workshops conducted by the National Bureau of Standards in cooperation with them, and that efforts should be made to continue the program with full support. Questions were raised, but no consensus reached on the desirability of standardization being proposed as a distinct topic for the U.N. Conference on Science and Technology for Development.

PB-283 958/7 PC A15/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Manual de Technologia para la Comunidad (Village Technology Handbook).
1972, 342p
Text in Spanish.

Keywords: Developing countries, Handbooks, Community development, Rural areas, Economic development, Crafts, Water resources, Sanitary engineering, *Irrigation, Construction materials, *Roads, Food, Snails, Washing, Hoating, *Food storage, *Solar water heating, *Sewage disposal, *Handicrafts, *Water supply, *Housing, Village technology.

Village development takes on special importance in the light of the fact that 80% of those who live in less developed countries live in villages. This handbook is aimed at helping villagers to master the resources available to them. The general topics covered include water transport, storage, and purification; latrines; Bilharziasis control; Irrigation and road-building; Poultry raising; Silage; Storing food at home; Storing vegetables and fruit for winter use; How to salt fish; Concrete construction; Bamboo construction; Glues; Solar water heater; Washing machines; Cookers and stoves; Home soap making; and Bedding.

PB-283 965/2 PC A13/MF A01
Wisconsin Univ.-Madison. Coll. of Agricultural and Life Sciences.
Non-Conventional Proteins and Foods: Proceedings of a Conference Held at the University of Wisconsin-Madison on October 18-20, 1977
Harlow J. Hodgson, and Howard W. Ream. Oct 77, 292p* NSF/RA-770278
Grant NSF-AER77-10185

Keywords: Meetings, Food, Nutrition, Nutritive value, Food composition, United States, Food analysis, Food industry, Seeds, Tables(Data), Methodology, Flavor, Animals, *Food products, *Proteins.

The Non-Conventional Proteins and Foods Program aims to create the technology for increasing the capacity of the United States to produce proteins and other food materials from non-conventional sources on an economically competitive basis. In order to promote exchange of information between grantees and potential users of their results, a grantees/users conference was conducted. Topics relating to protein from seeds included: (1) elimination of objectionable flavor component in Soya Protein products; (2) production of protein isolates and concentrates from oilseed flours using industrial ultra filtration and reverse osmosis systems; (3) enzymatic hydrolysis of vegetable protein; (4) JoJoba seed meal as an animal feed; (5) breeding, domestication, and utilization of the Buffalo Gourd; and (6) use of linear programming.

PB-284 204/5 PC A16/MF A01
International Council of Scientific Unions, Bangalore (India). Committee on Science and Technology in Developing Countries.
Technical Information Services for Developing Countries
Apr 77, 359
Prepared in cooperation with Indian Inst. of Science, Bangalore.

Keywords: Information systems, Meetings, *Information services, Developing countries, Librarians, *Libraries, Problem solving, Rural areas, Urban areas, In-

formation centers, India, Computer networks, Policies, Appropriate technology.

ICSU (International Council of Scientific Unions)/ COSTED (Committee on Science and Technology in Developing Countries)--has organized this Seminar on 'Technical Information Services for Developing Countries' with the hope that it will enable scientists and librarians to discuss urgent problems of developing countries and how suitable methods can be evolved to tackle such problems. The information services that are now available are not geared to tackle such problems as they do not even cater to the needs of more than 80% of the rural population. At several informal gatherings during the seminar this topic had come up and over 100 librarians and scientists that were present contributed their ideas as to how this can be rectified. Scientists and librarians from Sri Lanka, Bangladesh, Malaysia, Thailand, Singapore and India participated in the Seminar and presented views regarding problems pertaining to their countries.

PB-284 218-T PC A14/MF A01
Agricultural Research Service, Washington, DC.
A Handbook of Pests, Diseases, and Weeds of Quarantine Significance. Second Edition
1978, 318p Rept no. TT-74-52012

Keywords: Handbooks, Parasites, *Plant diseases, Quarantine, Distribution, Flax plants, Plants(Botany), Weeds, Translations, *USSR, *Pest control, Hemp, Berries, Bacterial diseases, Fungus diseases, Nematoda, Cotton fibers, Parasitic plants, Citrus trees, Fruits, Flowers, *Grains(Food), *Vegetables, *Potatoes, *Weed control, Compositae, Solanaceae.

The recent increase in imported agricultural products, seeds and plants has augmented the danger of introducing plant pests, diseases, and weeds not otherwise found in the USSR or confined to small areas. This threat places a grave responsibility on the quarantine services of the Ministry of Agriculture, USSR, to prevent the entry of exotic pests, diseases, and weeds harmful to Soviet agriculture. The purpose of this Handbook is to provide plant-protection personnel with necessary information on quarantine plants, pests, diseases, and weeds presently unknown in the USSR, the crops affected by them, the regions of their distribution, quarantine checks, and methods of control.

PB-284 392/8 PC A19/MF A01
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Program Operations.
Methods for the Determination of Chemical Contaminants in Drinking Water - Participants Handbook
John D. Pfaff. Nov 77, 429p* Rept no. EPA/430/1-78/008

Keywords: Potable water, Water analysis, Manuals, Instructional materials, Chemical analysis, Education, Metals, Silver, Cadmium, Chromium, Lead(Metal), Mercury(Metal), Arsenic, Selenium, Water pollution, Inorganic nitrates, Organic compounds, Fluoride, Barium, Chlorine, Pesticides, Herbicides, Turbidity, Laboratory equipment, Regulations, *Water quality, Water pollution detection, Drinking water.

This laboratory manual is designed to contain analytical procedures for all parameters listed in the National Interim Primary Drinking Water Regulations (NIPDWR). Some procedures may be carried out by operators or laboratory technicians with little or no experience (chlorine, turbidity, fluoride, nitrate) while other parameters require understanding and experience in using sophisticated analytical equipment (atomic absorption, gas chromatography). Parameters included are procedures for silver, cadmium, chromium, lead, mercury, arsenic, selenium, nitrate, fluoride, barium, chlorine, turbidity, pesticides, herbicides. It is written in a step-by-step format.

PB-284 482/7 PC A17/MF A01
Michigan Univ., Ann Arbor. Inst. for Social Research.
Improving the Quality of Life at Work: An Evaluation of the Centerton Experience. Volume I
Final rept.
Veronica F. Nieva, Dennis N. T. Perkins, and Edward E. III Lawler. Mar 78, 394p DLMA-21-26-74-16-1
Grant DL-21-26-74-16

Keywords: Quality of life, Industrial plants, Productivity, Attitude surveys, Job analysis, Leadership, Motivation, Absenteeism, Personnel management, Personnel selection, Salaries, Program effectiveness, *Management techniques, Quality of worklife.

This report describes a behavioral science consulting effort intended to improve the quality of working life (QWL) at a newly established pharmaceutical plant. The research covered a period of four years, from late 1972 when the decision was made to institute the QWL program, to early 1977 when consultation was officially terminated. Evaluation data were collected at the Centerton plant, site of the QWL program, and at Baytown, and a comparison plant under the same corporate management. A variety of instruments and methods were employed in the research, including self-administered questionnaires, group and individual interviews, and the analysis of archival data.

PB-284 483/5 PC A11/MF A01
Michigan Univ., Ann Arbor. Inst. for Social Research.
Improving the Quality of Life at Work: An Evaluation of the Centerton Experience. Volume II
Final rept.
Veronica F. Nieva, Dennis N. T. Perkins, and Edward E. III Lawler. Mar 78, 249p DLMA-21-26-74-16-2
Grant DL-21-26-74-16

Keywords: Quality of life, Industrial plants, Productivity, Attitude surveys, Job analysis, Leadership, Motivation, Absenteeism, Personnel management, Personnel selection, Salaries, Program effectiveness, Questionnaires, *Management techniques, Quality of worklife.

This report describes a behavioral science consulting effort intended to improve the quality of working life (QWL) at a newly established pharmaceutical plant. The research covered a period of four years, from late 1972 when the decision was made to institute the QWL program, to early 1977 when consultation was officially terminated.

PB-284 681/4 PC A07/MF A01
Futures Group, Inc., Glastonbury, Conn.
A Technology Assessment of Vegetable Substitutes for Animal Protein in Human Food. Volume 1. The Study
H. S. Becker, R. Richmond, E. W. Lusas, and S. P. Clark. Mar 78, 136p* 352-46-21/01, NSF/RA-780070
Contract NSF-C-ERS77-19549
Prepared in cooperation with Texas A and M Univ., College Station.

Keywords: *Technology assessment, *Vegetables, Food, Substitutes, Food consumption, Food chemistry, Legislation, National government, Grains(Food), Oilseeds, Leguminous plants, Potatoes, Tables(Data), *Proteins, Diets, Human nutrition, Recommendations.

The report encompasses a detailed technology assessment of vegetable substitutes for animal protein in human food. The potential exists for vegetable protein to be an important substitute for animal protein in the human diet, but the substitution must take place in areas where consumption of animal protein is or could be high. Vegetable protein is being used in the United States as analogs, ingredients, and extenders of meat and dairy products. Studies have indicated that over the next 10-15 years, emphasis will be placed on using vegetable protein as a meat extender, rather than a direct analog. Federal legislation will continue to be highly important, and most likely will be directed towards the technology and development of new vegetable protein products, rather than influencing consumer purchasing patterns. Several factors are involved in substituting vegetable protein, one of the most important of which is the form the substitution should take. A recommendation is made for a complete technology assessment, which should include all important technological and socio-economic factors.

PB-284 682/2 PC A04/MF A01
Futures Group, Inc., Glastonbury, Conn.
A Technology Assessment of Vegetable Substitutes for Animal Protein in Human Food. Volume 2. Appendices
H. S. Becker, R. Richmond, E. W. Lusas, and S. P. Clark. Mar 78, 72p* 352-46-21/02, NSF/RA-780071
Prepared in cooperation with Texas A and M Univ., College Station.

Keywords: *Technology assessment, *Vegetables, Food, Substitutes, *Proteins, Diets, Human nutrition, Food consumption, Food chemistry, Legislation, National government, Tables(Data).

The potential exists for vegetable protein to substitute importantly for animal protein in the human diet in the United States. A detailed technology assessment design of vegetable substitutes is the primary intent of this study. Phase I assesses the feasibility of accomplishing the research and then describes in detail the approach to the technology assessment of (a possible) Phase II. In this volume, Appendices A and B contribute to that assessment. In Appendix A, human physiology and the need for protein is addressed in discussions of metabolism and daily protein requirements and the impact of changes in protein intake. Appendix B includes the results of a mini technology assessment. This assessment of vegetable substitutes for animal protein as human food addresses: (1) factors important to food-consumption patterns; (2) historic food-consumption patterns; (3) important future sources of vegetable protein, including the influence of technology, legislation, and other factors; (4) potential impacts of vegetable substitutes; and (5) potential policy implications.

PB-284 742/4 PC A03/MF A01
Minnesota Legislature Science and Technology Project, St. Paul.
Parameters for Legislative Consideration of Bioconversion Technologies
Tom P. Abeles, and Janna R. King. Feb 78, 45p
NSF/RA-780196
Grant NSF-ISP76-02379

Keywords: Fuels, *Bioconversion, Ethyl alcohol, *Waste disposal, Ethanols, Minnesota, Fermentation, Sugar beets, Grain crops, Cellulose, Wood, Manufacturing, Agricultural wastes, Solid waste disposal, Nebraska, Recommendations, Planning, Biomass, Gasohol.

Included in this report and the minibrief which accompanies it are conclusions and recommendations that evolved from the examination of various models of biomass production of nonpetroleum fuels. This included the Nebraska Grain and Alcohol Program. It was determined that it was neither economically nor energetically wise at this time for Minnesota to commit itself to a gasohol program modelled after Nebraska's program. Instead of adopting the single source, large scale Nebraska model, it was concluded that Minnesota should do the pilot and demonstration plants for the production of ethanol on the small scale (farm or local co-op size), and encourage the utilization of a variety of feedstocks such as, sugar beets, grains and cellulosic residues.

PB-284 824/0 PC A06/MF A01
Environmental Protection Agency, Washington, DC. Office of Water Program Operations.
Application of Sludges and Wastewater on Agricultural Land: A Planning and Education Guide
Technical rept.
Bernard D. Knezek, and Robert H. Miller. Mar 78, 103p* EPA/MCD-35
Also available as North Central Regional Research Project Pub-235.

Keywords: Sludge, Education, *Waste water reuse, Farms, Water pollution control, *Agriculture,*Waste recycling, Decision making, Food processing, Industrial wastes, Municipalities, Economic factors, Soil fertility, Viability, Production, Farm crops, Site surveys, Farm management, Planning, Public health, Acceptability, Law(Jurisprudence), Land application, Sludge utilization, Guides.

The report addresses the application of agricultural processing wastes, industrial and municipal wastes (i.e., sludges and wastewaters) on agricultural land as both a waste management and resource recovery and reuse practice. The document emphasizes the 'treatment' and beneficial utilization of sludge and wastewater as opposed to waste disposal. These objectives are achieved through incorporation into well-designed and operated agricultural production systems in ways that are compatible with maintaining the soil's normal viability and productivity. Waste characterization, crop selection and management, site selection, management and monitoring are addressed in a

manner designed to lead readers logically through the decision making process.

PB-284 958/6 PC A06/MF A01
Research Group International, Charlottesville, Va.
Development Plans and Technology Transfer
Final rept.
William F. Beazer, and Jose Peman. Jan 78, 110p
NSF/PRA-77-SP-0857/1/8

Keywords: *Technology transfer, Developing countries, Economic development, Planning, Objectives, Industries, Technology assessment, Foreign countries, Government policies, India, Afghanistan, Kenya, Philippines, Brazil, Mexico, Needs.

The project was a feasibility study to ascertain the extent to which information provided by official development plans of less developed countries can be used to project these countries' science and technology needs. Past economic development plans of a sample of five countries are examined to determine goals and targets set out in these plans, and an analysis is made of the extent to which these targets were achieved, using past economic and social data. Present development plans are reviewed to determine which specific objectives each nation hopes to accomplish, including industries each nation hopes to establish and/or expand within each sector (agriculture, manufacturing, mining, services). A framework for the assessment of technology needs and imports for developing countries is provided.

PB-284 990/9 PC A18/MF A01
Midwest Research Inst., Kansas City, MO.
A Technology Assessment of Biological Substitutes for Chemical Pesticides
Final rept.
Edward W. Lawless, Rosmarie von Ruemker, Gary L. Kelso, Kathryn A. Lawrence, and James D. Maloney.
Dec 77, 419p* NSF/RA-770508
Contract NSF-C349

Keywords: *Pesticides, Pest control, *Technology assessment, Hazardous materials, Substitutes, Reviews, Surveys, Regulations, National government, Public policy, Public health, Ecology, Benefit cost analysis, Utilization, Forecasting, Economics, Biological pest control.

A preliminary comprehensive technology assessment has been made of the potential 'biological substitutes' for chemical pesticides. The authors identified a group of pest control technologies that would not depend on extensive first-choice reliance on conventional chemical pesticides, and made the assessment for this group. The assessment began with a survey of the driving forces of using pest control, in general, and of the reasons why biological and related methods might be substituted for chemicals. A review was made of the types of pest problems that major pesticide user groups have, and of the approaches they use to control various pests. A review also was made of those government regulations that have been developed to control the use of chemical pesticides and of those that might apply to the proposed use of biological and related methods. Studies were made of the current state of development, production, and extent of use of the chemical pesticides, and of the human health environmental, economic, and other benefits or disbenefits and controversies that accompany this usage. Two scenarios were developed reflecting alternative growth patterns through the year 1990 for both chemical and biological methods. Additional information on the general approach to this technology assessment is given in Appendix A.

PB-285 413/1 PC A03/MF A01
Card Corp., Denver, CO
Aluminum
John W. Stamper, and Horace F. Kurtz. May 78, 36p* Rept no. BUMINES-MCP-14
Report on Mineral Commodity Profiles.

Keywords: *Aluminum, *Bauxite, Economic analysis, Mining, Reserves, Beneficiation, Extraction, Production, Supply(Economics), Demand(Economics), Metal industry, Forecasting, Utilization, Specifications, Stockpiling, Government policies, Prices, Substitutes, Plant location, Geology, Metal scrap, Containers, Refractories, Chemical industry, Abrasives, Tables(Data), International trade, Contingency planning, Secondary materials industry, Electric power consumption, Environmental effects.

The world aluminum industry is reviewed in terms of ownership and geographic distribution. Bauxite resources, mining, and production processes through the primary metal stage and secondary recovery are briefly described. The economic and environmental factors associated with aluminum production are discussed. The report gives an overview of the uses of aluminum metal in transportation, construction, food and beverage packaging, electrical esquipmnet, machinery, consumer products, and uses of bauxite and alumina in refractories, abrasives and chemicals, and forecasts the use of aluminum to the year 2000. While U.S. mine production from bauxite and nonbauxitic materials could reach as high as 1.8 million tons (aluminum equivalent), the nation is expected to rely increasingly on imports for a major portion of supply. World bauxite reserves were considered sufficient to supply anticipated world demand for primary aluminum.

PB-285 437/0 PC A09/MF A01
Material Systems Corp., Escondido, Calif.
A Study of the Feasibility of Utilizing Solid Wastes for Building Materials. Phase III and IV Summary Reports
Final rept. Sep 75-Mar 78.
May 78, 192p* EPA/600/2-78/111
Contract EPA-68-03-2056
See also PB-279440.

Keywords: Construction materials, Solid waste disposal, Industrial wastes, Reclamation, *Agricultural wastes, Fire resistant materials, Particle boards, *Wood wastes, Composite materials, Reinforced plastics, Panels, Ceilings, Roofs, Walls, Laboratory tests, Mechanical properties, Performance evaluation, Buildings, Cost estimates, *Building materials, *Waste recycling, Rice hulls, Peanut shells.

This report summarizes work to develop building materials containing inorganic and organic wastes and wastes-derived products. Attempts were made to produce full-scale products and qualify them for structural applications. Particle board panels were made of peanut hulls and wood waste on production-type equipment. Particle boards of peanut hulls have mechanical properties that are slightly less desirable than those of commercially available boards, and the economics are marginal. However, particle board panels of wood waste can be competitive with commercial products. Two hour, fire-rated structural walls made from inorganic rice hull foam could also be viable, as could floors, roofs, ceilings, and the 90-minute, fire-rated door with a rice-hull foam core and a wood-waste frame. These tests completed generation of the data required for building code approval.

PB-285 717/5 PC A10/MF A01
Synergy Consultation Services, Saratoga, Calif.
Alternative Futures Planning
James L. Creighton. Aug 76, 215p

Keywords: *Water supply, Planning, California, Benefit cost analysis, Evaluation, Substitutes, Citizen participation, Public opinion, Demand(Economics), Financial management, Decision making, Feasibility, Water demand, Lake County(California), Napa County(California), Yolo County(California), Solano County(California), Alternative planning, Scenarios.

This report describes the development and application of planning procedures which involve the public in projecting alternative futures and then provide a method of evaluating alternatives in an effort to protect, rather than foreclose, the options represented by the alternative futures. These planning procedures were applied as a study of the total water needs of four California counties--Lake, Napa, Yolo, and Solano.

PB-285 734/0 PC A05/MF A01
General Accounting Office, Washington, D.C. International Div.
Agency for International Development's Housing Investment Guaranty Program
Report to the Congress.
6 Sep 78, 88p Rept no. ID-78-44

Keywords: Federal assistance programs, Developing countries, Shelters, Low income groups, *Housing, Financing, Foreign countries, Project management, Housing studies, National government, Agency for International Development, Loans.

The report describes the operation and accomplishments of the Agency for International Development's Housing Investment Guaranty Program in helping developing countries to meet the shelter needs of their poor. The review provides an evaluation of the Housing Investment Guaranty Program and identifies some of the problem areas in the planning and management of housing development assistance. The report makes recommendations to help the Agency for International Development improve its efforts to provide shelter assistance to the developing countries.

PB-285 764/7 PC A02/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Development, Washington, DC.
Basics of Concrete
Ideas and methods exchange.
Nov 60, 25p Rept no. IME-49
Prepared in cooperation with Agency for International Development, Washington, DC.

Keywords: *Concrete, Air entrained concretes, Portland cements, Concrete construction, Masonry cements, Prestressed concrete, Ready mixed concrete, Concrete finishing, Admixtures, Developing country applications.

Concrete, when properly prepared and used, is one of the most versatile of building materials, and is used to some extent throughout the world in the production of housing. Failures occur when the simple rules essential to the production of good quality buildings of concrete or concrete products are ignored. The material contained herein consists of a series of articles on good practice in the preparation and use of concrete and concrete masonry which appeared in the September and November 1957 issue of the NAHB Journal and are reproduced with the permission of the National Association of Home Builders.

PB-285 766/2 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
A Systematic Approach to Basic Utilities in Developing Countries
Ideas and methods exchange.
May 74, 64p Rept no. IME-70
Prepared in cooperation with Agency for International Development, Washington, DC.

Keywords: *Sewage disposal, *Water supply, Developing countries, Design, Construction, Water distribution, Distribution systems, Constraints, Hydraulics, *Roads, Standards, Chlorination, Pavements, Water quality, Sewers, Water wells, Lagoons(Ponds), Septic tanks, Pipes(Tubes), Water pollution standards.

Partial contents:
- Providing water to a community;
- The sewage disposal system;
- The road system;
- Planning and managing basic utilities;
- Systematic analysis;
- The water supply system.

PB-285 768/8 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Prefabricated Concrete Components for Low-Cost Housing Construction: 407 Building Design and Construction, Prefabrication
Ideas and methods exchange
Jun 70, 40p IME-59

Keywords: *Houses, Prefabrication, *Concrete, Developing countries, Design, Construction, Assembling, Low cost housing, Developing country application.

The system of construction described in this publication was developed originally in Surinam by Mr.Joseph Coulam under the U.S. technical assistance program and later refined under the Agency for International Development program of technical cooperation with Barbados. Although the publication deals in part with the adaptation of this system to the construction of small movable dwellings known in Barbados as 'Chattel Houses', the system is just as useful in building low-cost, permanently located dwellings. The system pro-

vides simplicity, durability, and low-cost, and appears to be adaptable for use in aided self-help programs generally.

PB-285 769/6 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Strengthening Urban Administration in Developing Countries: With Emphasis on Latin America
Ideas and methods exchange.
Jul 71, 74p IME-67

Keywords: *Urban planning, Developing countries, *Latin America, Local government, Management, Development, Planning, Urbanization, Government policies, Legislation, Taxes, Fiscal policies, Urban growth, Developing country application.

The complex problems of managing the massive acceleration of urban growth in the developing countries while at the same time improving the quality of urban services and renewing the obsolete urban structure of the older cities poses administrative, legislative, and financial demands without precedence in the developed countries. In this publication, PADCO, Inc. attempts to summarize the main problems facing Latin American countries in urban administration and to indicate the implications affecting urban development and planning. Each Latin American country has evolved its own set of administrative, legislative, and financial tools for dealing with urbanization. This fact makes it difficult to generalize both concerning experience and recommendations for improvement. It is hoped, however, that this overview of the central issues will prove useful in providing the planner and urban administrator with a better understanding of how his own work is affected by the national, regional and local context in which he operates. The root causes of many day-to-day problems to be faced by urban administrators may not be within their immediate control at all, but rather stem from inadequate or incomplete national policy and legislation. The importance of establishing the national framework for guiding urban development is a recurring theme of this publication.

PB-285 907/2 PC A04/MF A01
United Nations Children's Fund, Kathmandu (Nepal).
Use of Hydraulic Rams in Nepal. A Guide to Manufacturing and Installation
Mitchell Silver. Sep 77, 57p

Keywords: Rams(Pumps), Design, Hydraulic power pumps, Water pressure, *Water supply, Check valves, Assembling, Installing, Developing countries, *Nepal, *Hydraulic rams, Developing country application.

The hydraulic ram pump can be used with great effectiveness in mountain villages which are located at a higher elevation than their source of water. The hydram pump uses the power of falling water to pump a small portion of that water uphill. It requires absolutely no fuel or electricity, only water pressure. The pump was developed about 200 years ago, and the beauty of the hydram lies in its simplicity. There are only two moving parts which are lubricated by the water itself. This manual hopes to show that anyone with a minimal amount of mechanical aptitude can survey, design and build a hydraulic ram from locally available parts, and do any necessary maintenance.

PB-285 908/0 PC A04/MF A01
Department of State, Washington, DC. Foreign Service Inst.
Intermediate Technology: An Informal Survey
Peter W. Askin. 1976, 64p
Proceedings of Senior Seminar in Foreign Policy (Eighteenth Session).

Keywords: Technology, Meetings, Developing countries, Concepts, Economic development, Industries, Investments, Attitudes, Reviews, Technical assistance, Foreign policy, Philippines, Indonesia, Sri Lanka, International relations, Intermediate technology, Developing country application, *Appropriate technology, Industrialization, Case studies.

Contents:
The concept (Some definitional problems);
Some LDC attitudes and applications (The Philippines, Indonesia, Sri Lanka);
On the role of international assistance.

PB-285 909/8 PC A08/MF A01
Texas Transportation Inst., College Station.
Handbook for Building Homes of Earth
Lyle A. Wolfskill, Wayne A. Dunlop, and Bob M. Callaway. 1977, 163p
Prepared for Agency for International Development, Washington, DC. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.

Keywords: *Houses, Construction materials, *Building materials, *Soils, Soil classification, Soil compacting, Soil stabilization, Soil tests, Manufacturing, Foundations, Developing countries, Handbooks, Earth construction, Developing country application, Adobe blocks, Pressed earth blocks.

This manual describes broadly the kinds of soil that are found in various parts of the world and tells what can be expected of them. It then tells what is best to do with each of them, alone or in combination with others, to make them good enough to use or make them better with the use of stabilizers. Then, it explains which of the three general kinds of earth construction is best for use with the kinds of soil available. It also describes simple tests anyone can perform that tell the builder how well he is succeeding in what he is trying to do. After chapters on picking out places to build, how to make a good foundation for any kind of house, and how to build a roof, the manual has separate chapters on adobe, rammed earth, and pressed block construction.

PB-285 950/5 PC A06/MF A01
Idaho Univ., Moscow. Forest, Wildlife and Range Experiment Station.
Aquaculture Techniques: Water Use and Discharge Quality
G. W. Klontz, Irvin R. Brock, and John A. McNair. Apr 78, 120p OWRT-A-054-IDA(1)
Contract DI-14-34-0001-8014

Keywords: Fisheries, *Waste water, *Aquaculture, *Water pollution, Test methods, Feeding stuffs, Rates(Per time), Diets, Oxygen, Dissolved gases, Growth, Fresh water fishes, Size measurement, Temperature, Production, Efficiency, Solids, Predictions, Replacing, Computer programs, Fishes, IRV computer program, Animal populations, OWRT computer program.

The objectives were to develop and test methods of predicting waste product generation from aquaculture facilities. Factors chosen for testing were (1) feeding rate; (2) diet efficiency; (3) growth rate; (4) population density; (5) water replacement time; (6) oxygen consumption; (7) fish size; and (8) water temperature. Significant results are: (1) The identification of factors not only involved with the generation of waste products from an aquaculture facility, but also having the potential of affecting the production of an aquaculture facility; (2) The development of a practical method for determining oxygen consumption of fish in varying controlled environmental conditions; (3) The development of a computerized program for fish growth in optimized loading conditions of population density and water replacement time; (4) The development of a method to predict more accurately the anticipated growth rate of a group of fish; (5) The development of a method to predict the solids, both settleable and suspended, produced daily by a group of fish being held in known conditions.

PB-285 963/5 PC A04/MF A01
New Mexico State Univ., University Park. Water Resources Research Inst.
Water Treatment for Small Public Supplies
D. B. Wilson, H. G. Folster, G. Kramer, S. Hanson, and W. Boyle. May 78, 74p WRRI-095, OWRT-T-0009(7515)(1)
Contract DI-14-34-0001-7515

Keywords: Potable water, New Mexico, *Water supply, *Water treatment, Electrodialysis, Design, Osmosis, Fluid filters, Membranes, Selection, Construction, Operations, Project planning, Objectives, Performance evaluation, Residential buildings, Cost engineering, Brines, Ground water, Regulations, Reverse osmosis.

Approximately 800 community-type public water supplies in New Mexico are initially affected by the regulations adopted by the U.S. Environmental Protection Agency under the Safe Drinking Water Act. The project described is primarily the selection, design, construction, and operating procedures for a portable demonstration water treatment system using reverse osmosis and electrodialysis to provide information to small New Mexico communities for improving their drinking water supplies to meet existing regulations. The project's specific objectives are to develop operating conditions and information for an engineering evaluation of reverse osmosis and electrodialysis and their secondary support processes, to develop specific cost data, to extend available water treatment technology in the area of single solute removal from drinking water containing a large number of ionic and dissolved species, to provide the necessary material for assimilation of this unit or comparable equipment into the educational activities of water supply and water treating, and to evaluate brine disposal methods in compliance with New Mexico groundwater regulations.

PB-285 977/5 PC A13/MF A01
Oregon State Univ., Corvallis. Dept. of Soil Science.
Utilization of Waste Heat in a System for Management of Animal Residuals to Recover and Recycle Nutrients
Final rept.
L. L. Boersma, E. Gasper, J. R. Miner, J. E. Oldfield, and H. K. Phinney. Apr 78, 299p NSF/RA-780250
Grant NSF-GI-43681, NSF-AEN74-14960-A01
Sponsored in part by Office of Water Research and Technology, Washington, DC. and Grant NSF-AEN74-14960-A02.

Keywords: *Methane, Feeding stuffs, *Bioconversion, *Waste heat utilization, Algae, Bacteria, Protein, Biomass, Agricultural wastes, Nutrients, Anaerobic processes, Swine, Cost analysis, Chorella, Process charting, Design criteria, Solid wastes, *Manures, *Waste recycling, Manufactured gas, Synthetic fuels.

Major findings of an investigation into the concept of nutrient and energy recovery from a swine waste management system are reported. Algae and bacteria were used to convert swine manure into methane-rich fuel gas and supplemental protein for animal feed. Waste heat from electricity generating plants was simulated to test its value in enhancing the biological recovery of nutrients and energy. The anaerobic digestion of the manure solids removed 55 percent of the total solids. The destruction of the volatile solids was 56 percent, and the COD was reduced by 41 percent. The daily gas production averaged 1.06 cu m/kg VS removed. The gas contained 68 percent v/v CH4 and 32 percent v/v CO2. The necessity to dilute the swine waste with large volumes of water in order to make the liquid phase of the manure suitable for algal growth, and the potentially high cost of harvesting and processing the algae, prompted the consideration of other management systems for the recovery of nutrients and energy from swine manure, including the culturing of yeast, microfungi, and fish. Architectural perspectives and plan views were developed for each management system together with schematic diagrams showing the flow of energy and materials through each system, based on the feed and energy needs and the waste discharge of 100 pigs.

PB-285 983/3 PC A05/MF A01
United Nations Children's Fund, Kathmandu (Nepal).
Standards and Procedures for the Design of Water Supply Systems in Rural Areas of Nepal and Bhutan
Technical manual
Carl R. Johnson. 1976, 100p*
Prepared in cooperation with Peace Corps/Nepal.

Keywords: Water distribution, *Water supply, Developing countries, Manuals, Intake systems, Reservoirs, Pipelines, Design, *Water quality, Feasibility, *Bhutan, Embankments, Populations, Rural areas, Hydraulics, Friction, Standards, *Nepal, Developing country application, Water demand, Instruction manuals.

This manual is especially written as a reference for persons engaged in rural water supply design and construction for the Remote Area and Local Development Department of His Majesty's Government of Nepal and its assisting agencies: UNICEF, WHO, American Peace Corps, and German Volunteer Service. The coverage of specific topics ranges from criteria and considerations for the design of certain water system features to fully developed standard designs, estimates, and specifications for other features. Design criteria are presented where standard designs cannot be practically used, while the standard designs that are

included are for guide purposes only and should always be carefully scrutinized in light of the specific conditions at the construction site.

PB-285 984/1 PC A02/MF A01
Agency for International Development, Washington, DC.
Rural Enterprises: An Overview of the Role and Potential of Rural Enterprises to Contribute to the Employment and Income of the Rural Poor
Samuel Daines, Felicia Morrow, and William Rodgers. Apr 77, 19p

Keywords: Rural areas, Farm processing, Developing countries, Agricultural economics, *Employment, Income, Manpower, Economic development, Industries, Food processing, Woodworking, Businesses, Foreign aid, Low income groups, *Small businesses, Developing country application, Nonmetropolitan areas.

As agricultural output increases, new opportunities develop for providing goods, services, and markets in rural areas. Farmers require additional farm inputs and processing and marketing facilities for outputs. In addition, rising rural incomes create new demand for consumer products. By providing a supportive environment for rural based enterprises, governments can potentially improve the welfare of rural populations and further stimulate agricultural production. The paper discusses how rural enterprises can contribute to the overall economy and what mechanisms have been used in attempts to stimulate their development.

PB-286 018/7 PC A03/MF A01
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Utilization of Earthworms and Microorganisms in Stabilization, Decontamination and Detoxification of Residual Sludges from Treatment of Wastewater
Final rept. 1 Jun 76-31 May 78
Roy Hartenstein, and Muron J. Mitchell. 1978, 34p
NSF/RA-780171
Grant NSF-ENV77-06994

Keywords: Sludge drying, Sludge digestion, Sludge disposal, Aerobic processes, Invertebrates, Worms, Toxicity, Nematoda, Decomposition, Soils, Moisture content, Stabilization, *Sewage treatment, Microorganisms, *Waste water, Sewage sludge, Earthworms.

Findings are presented of studies determining the role of invertebrates in sludge disposal management using four secondary-treatment domestic sludges, including an aerobic digest and anaerobic digests from three separate wastewater treatment plants. Data previously unavailable on the chemical content of the organic matter in sludge residues are disclosed. Anaerobic sludges are shown to be toxic to earthworms when Eh is low but, if applied to a mineral topsoil, are invaded sequentially by nematodes, enchytraid worms and earthworms, as the sludges become aerated increasing its Eh. Functional moisture and temperature relationships are established for sludge conversion into feces by earthworms and isopods. Earthworms placed into aerobic sludge drying beds cause accelerated sludge stabilization and enhance aerobic decomposition product production when moisture is held below a critical level. Moisture content is the major determinant of whether an aerobic or anaerobic decomposition pathway is taken. Earthworm feeding activity is shown to stimulate an increase in nematode population density which promotes an observed bacterial turnover hastening sludge decomposition and stabilization. Data on the effect of heavy metals and the presence or absence of certain enzymes are discussed. Additional studies on enzymes and decomposition processes are reported in abstract form.

PB-286 096/3 PC A03/MF A01
National Bureau of Standards, Washington, DC.
Factors Affecting the Durability of Adobe Structures
Paul Wencil Brown, Carl R. Robbins, and James R. Clifton. Jul 78, 42p Rept no. NBSIR-78 1495

Keywords: Construction materials, Residential buildings, Cohesive soils, Weathering, *Building materials, Physical properties, Mineralogy, Particle size distribution, Size determination, X ray diffraction, Porosity, Durability, Moisture content, Inorganic salts, Chemical composition, Arizona, *Adobe, Historic buildings, Historic preservation, Tumacacori National Monument, Fort Bowie National Historic Site, Escalante Ruin.

Adobe samples from three sites of historic interest in the State of Arizona were analyzed to determine their mineral assemblages, particle size distributions, soluble salt contents, and porosities. These analyses were accompanied by microscopic observations of polished sections and thin sections. These data were correlated with the weathering observed and it was found that soluble salt action was responsible for the deterioration of the adobe from one of the sites. The nature of the particle size distribution has resulted in the rapid deterioration of the adobe from a second site. The adobe from a third site was found to be well consolidated due to the presence of large amounts of calcite.

PB-286 164/9 PC A11/MF A01
Stanford Univ., CA. Communications Satellite Planning Center.
System Planning for Agricultural Education in Developing Countries
Technical rept.
Djafar Esmaili Djawan. Dec 76, 227p Rept no. TR-14

Keywords: *Education, *Agriculture, Developing countries, Farm management, Iran, Planning, Programmed instruction, Television broadcasting, Professional training.

A manpower projection model, developed by Iran's Plan and Budget Organization, is reviewed and extended. The model projects expected growth in different sectors of Iran's economy made possible by revenues from oil exports. These projections, together with descriptions of skill needs in each sector, determine the rates of training that would be required to support the indicated growth. The projections show major shortages in the training capacity of Iran's educational institutions, particularly in the areas of professionals and para professionals.

PB-286 227/4 PC A12/MF A01
Denver Research Inst., CO.
The Industrial Research Institute in a Developing Country: A Comparative Analysis
James P. Blackledge. 31 Aug 75, 273p
Contract AID/csd-3316

Keywords: Research, Industries, Developing countries, Organizations, *Technology transfer, Universities, Technology innovation, Coordination, Management, Government policies, Promotion, *Research and development, *Industrial development, Multinational corporations, Developing country application.

The study was initiated in 1970, with the hope that a pattern of operational characteristics, similarity of problems, and a uniform approach to technical assistance would emerge. The purpose behind this effort has been to provide relevant information which will help research institute managers and their senior staffs achieve stronger programs of interaction with industry, through sharing the experiences and problems of other developing country institutes confronted with similar situations. Further, it has been the author's hope that the study will assist interested persons, institutions, and organizations in the advanced countries to better understand the unique although complex problems facing the developing country institutes, and thus devise more appropriate and meaningful programs of assistance. The objectives of the study have been to: (1) Analyze a variety of approaches to industrial research which have been tried; (2) identify those factors which have contributed or inhibited effective coupling of industrial research institutes with industry and developmental interests; (3) differentiate between those types of constraints to development of viable institutes which are country-specific and those common problems which have limited the value of these institutes regardless of their geographical location. During the course of the study, some 50 research centers in 20 countries have been visited.

PB-286 275/3 PC A04/MF A01
Michigan State Univ., East Lansing.
A Mass Balance Study of Recycling Secondary Municipal Wastewater on Abandoned Field Ecosystems
Completion rept.
Thomas M. Burton. Jul 78, 57p OWRT-A-091-MICH(1)
Contract DI-14-31-0001-6023

Keywords: Circulation, *Land use, *Irrigation, *Waste water reuse, *Sewage treatment, Phosphorus, Nitrogen, Seasonal variations, Inorganic nitrogen, Concentration(Composition), Nutrients, Harvesting, Soil water, Plant growth, Grasses, Vegetation, Leaching, Michigan, Land application, Old fields, Agropyron repens, Solidago.

An experiment on the management of a municipal wastewater land application system using abandoned fields was conducted in 1976 and 1977 on a 10-year old oldfield site on thirty-six 0.07 ha plots arranged within 6 experimental blocks. Irrigation levels of 0, 5, and 10 cm/week of secondary effluent were used. Harvest treatments included no harvest, one harvest in June, and two harvests in June and September. Mass balances were constructed for phosphorus and nitrogen for all treatments. The oldfield was very effective at wastewater renovation at all levels of irrigation and for all harvest treatments through most of the growing season. Nitrate-N concentrations in soil water leaching past the 120 cm depth remained well below the 10 mg/l drinking water standard except during September and October on the unharvested plots. Phosphorus remained at background levels on all plots at the 120 cm depth. The irrigated harvested plots were dominated by quack grass (Agropyron repens) while the unharvested, irrigated plots were dominated by goldenrod (Solidago sp.). Vegetation response and plant species interactions are discussed.

PB-286 361/1 PC A08/MF A01
East Central Oklahoma State Univ., Ada. Animal Waste Technical Information Center.
Livestock and the Environment: A Bibliography with Abstracts. Volume V
Final rept. 1 Mar 77-28 Feb 78
M. L. Rowe, and Linda Merryman. Jun 78, 155p*
EPA/600/2-78/137
Grant EPA-R-805151

Keywords: Livestock, *Agricultural wastes, Industrial waste treatment, Bibliographies, *Animal wastes, *Bioconversion, *Water pollution, Beef cattle, Dairy cattle, Sheep, Poultry, Swine, Anaerobic processes, Ventilation, Methane, *Animal husbandry, Runoff, Waste disposal, Indexes(Documentation), Air pollution, Water pollution control, Abstracts, Feedlot wastes, Confinement pens, *Waste recycling, Manure, Waste utilization, Biogas.

Management and research information on animal wastes has expanded in recent years. This material has appeared in such diverse sources as journal articles, conference papers, university publications, government publications, magazine articles, books or book chapters, and theses. This bibliography was compiled in order to speed the flow of information on findings in one segment of the livestock industry to other segments that could benefit from this technology. Included in this publication are the following indexes: (1) author, and, (2) animal information categories. These indexes are followed by a section of abstracts of each reference entry found in the bibliography.

PB-286 423/9 PC A05/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Maisons en Terre (Earth for Homes)
Ideas and methods exchange no. 22.
May 69, 85p
Text in French.

Keywords: Residential buildings, Construction materials, *Soils, Construction, Floors, Walls, Roofs, Structural design, Developing countries, *Houses, *Building materials, Developing country application, Earth construction, *Adobe.

This is a nontechnical paper directed to those who wish to become informed on the uses of earth and to perhaps investigate its possibilities under conditions with which they are intimately concerned. Emphasized in the paper are soils, methods of earth wall construction, earth floors, earth roofs, wall finishes, and the design of earth homes.

PB-286 424/7 PC A07/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Housing.

La Construction en Climat Chaud (Physiological Objectives in Hot Weather Housing)
Douglas H. K. Lee. May 63, 127p
Text in French.

Keywords: *Houses, Environmental engineering, Hot weather construction, Human factors engineering, Ventilation, Air conditioning, Evaporative cooling, Physiological effects, Structural design, Developing country application, Housing.

The effects of heat on man and other elements of tropical and subtropical climate are discussed. Housing is examined as a protection against the climate. Methods to reduce the conduction of radiant heat from the sun and to reduce convection of heat and humid outside air by shades, awnings, and architectural design, as well as ventilation, air conditioning, and evaporation cooling are explained. The adaption of design to accommodate alternauve hot-dry and hot-humid climates and functional considerations are also reviewed.

PB-286 425/4 PC A06/MF A01
Agency for International Development, Washington, DC.
L'Eau et la Santé de l'Homme (Water and Man's Health)
Technical series no. 5
Arthur P. Miller. 1962, 120p
Text in French.

Keywords: *Water pollution, *Diseases, Disease vectors, Bacteria, Cholera, Bacillary dysentary, Tularemia, Paratyphoid, Diarrhea, Poliomyelitis, Toxicity, Metals, Radioactive wastes, Cyanides, Sulfonates, Chlorides, Chloroform, Phenols, Standards, Developing country application, Water pollution standards.

This pamphlet studies bacterial and chemical water pollutants. It discusses the transmission of disease through water; cholera, dysentery, leptospirosis, paratyphoid and typhoid fever, tularemia, dracunculosis, echinococcosis, schistosomiasis, amoebic dysentery, infectious hepatitis, diarrhea, pleurodynia, poliomyelitis, and several other diseases are discussed in depth. Chemical pollution of water by arsenic, barium, cadmium, chrome, cyanide, fluoride, lead, selenium, silver, alkylbenzine, sulfonate, choloroform, chlorides, copper, iron, mangagnese, nitrates, phenols, sulfates, zinc, and radioactive materials are also studied in depth. International and US standards for safe water are compared.

PB-286 426/2 PC A06/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Manuel Pratique de L'Equipement Rural (IV) Amenagement de la Ferme (Village Technology Handbook, Second Edition)
1964, 114p
Text in French.

Keywords: *Technical assistance, Handbooks, *Housing, *Sewage disposal, Farms, Developing countries, Technology, Water supply, Irrigation, Units of measurement, Community relations, Communicating, *Agriculture, Food processing, Farm processing, Farm buildings, Construction, Villages, Developing country application.

The purpose of the handbook is to help small farm improvement and farm management in many nations through listing ideas, methods and materials that have proven useful throughout the world. The following areas are discussed: water supply, and irrigation, drainage, making of the water mains and piping from Portland cement; building of small equipment such as barrows, graders and other small equipment used for farm irrigation; food processing and conservation of agricultural products, such as desiccation of grain, conservation of vegetables for the winter, silo storage and ensilage of corn crops; and construction of farm buildings, and bamboo as a building material; health and sanitation, agriculture, food processing and preservation, housing and construction, home improvement, communications, and tables which give conversions for temperature, length, and weight.

PB-286 428/8 PC A04/MF A01
Agency for International Development, Washington, DC.
Les Ravageurs des Grains Entreposes (Stored Grain Pests)
1968, 65p
Text in French.

Keywords: *Grains(Food), *Pest control, *Food storage, Insects, Classifications, Beetles, Coleoptera, Borers(Biology), Worms, Mites, Blattidae, Prevention, Developing country application.

Grain destroying insects are classified and their methods of infesting grain is explained. The pest parasites are mentioned and methods of prevention of infestation gone over. Some of the insect pests studied are weevils, beetles, caterpillars, meal worms, larder beetles, serricorn beetles, borers, silverfish, cockroaches, and mites.

PB-286 429/6 PC A03/MF A01
Department of Agriculture, Washington, DC.
La Prevention Contre les Moustiques dans les Terres Irriguees (Mosquito Prevention on Irrigated Farms)
1969, 47p
Text in French.

Keywords: Culicidae, *Irrigation, Pest control, Irrigation canals, Public health, Life cycles, Rice plants, Aquaculture, Drainage, Terracing, Irrigated land, Ponds, *Insects, *Mosquitoes, Developing country application, Habitats.

This book tells what measures to take to control mosquitos. The naturo and extent of the problem is discussed, its socio-economic and public health aspects are given. The mosquitos' biology and habitat, and problems of reconciling mosquito control with other goals such as irrigation, rice growing, and aquaculture are studied. The principal techniques of mosquito control are discussed including calculating, administering, and recording the optimal amount of water for irrigation, creating proper drainage and irrigation systems, and landscaping farm ponds.

PB-286 430/4 PC A05/MF A01
Agency for International Development, Washington, DC.
Diverses Methodes d'Irrigation (Various Irrigation Methods)
Karl O. Kohler, Geroge A. Lawrence, and William Stanley. 1962, 76p
Text in French.

Keywords: Corn plants, Surface irrigation, *Irrigation, Slopes, Terrain, Sites, Siphons(Water), Maintenance, Pipes(Tubes), Cultivation, Contour farming, Terracing, Developing country application.

This booklet tells how best to irrigate a farm using the slope of the land and grains to best advantage. Contour-furrow irrigation, furrow irrigation, corrugation irrigation, border irrigation, and irrigating corn are treated fully. How to site, survey, space, dig, and maintain the channels is covered, and when to use each method is discussed. The book also tells how much water to admit into each furrow, and covers underground conduits, siphons, sprinklers, preparing the earth, and seed bedding for corn.

PB-286 431/2 PC A04/MF A01
Agricultural Research Service, Washington, DC. Field Crops Research Branch.
La Culture du Sorgho pour la Production de Sirop (Culture of Sorgho for Sirup Production)
I. E. Stokes, O. H. Coleman, and Jack L. Dean.
1962, 55p
Text in French.

Keywords: *Food processing, Cultivation, *Sugarcane, Plant growth, Germination, Planting, Insects, Fertilizing, Herbicides, Plant diseases, Pest control, Harvesting, Evaporators, Sugars, Molasses, Developing country application.

The production of sirup from sorghum is outlined from planting the crop to final processing. A description of the plant and its sirup is given and nine varieties of sorghum are studied in depth. Diseases and insect pests that attack sorghum and their control is also explored. Growing the crop is outlined covering the soil, crop rotation, fertilization, preparing the seed bed, seedlings, how to plant, spacing plants, herbicides, and harvesting. A detailed account of how to make the sirup is also given.

PB-286 432/0 PC A03/MF A01
Department of Agriculture, Washington, DC.
L'Aviculture Sous un Climat Subtropical et Semi-Aride (Poultry Management in a Subtropical, Semiarid Climate)
Burt W. Heywang. 1962, 27p
Text in French.

Keywords: Tropical regions, *Poultry, Chickens, Production, Selection, Climate, Breeding, Eggs, Feeding stuffs, Poultry houses, Animal diseases, Ticks, Siphonaptera, Developing country application.

All aspects of poultry raising are described. A farmer can learn how best to care for his birds. Topics covered include choosing the right breed, market preferences, effects of climate and weather on different breeds, breeding, raising chicks in tents and in coops, feeding chicks and older birds, open air raising, egg laying, corrugated iron roofs, egg handling for sale, poultry diseases, ticks, and fleas.

PB-286 433/8 PC A04/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Amelioration de l'Habitat par la Promotion de l'Effort Personnel (Aided Self-Help in Housing Improvement)
Ideas and methods exchange no. 18
R. Douglas Stone, George A. Spear, Jacob L. Crane, Roy J. Burroughs, and J. Robert Dodge. 1968, 75p
Text in French.

Keywords: Houses, Improvement, Upgrading, Guidelines, Technical assistance, Developing countries, *Housing, Self help, Self help housing, Developing country application, Home ownership.

Aided self-help is the concept of self-help plus some form of aid so as to achieve an improved product. It is a principle which is adaptive to a variety of techniques and situations; it may capitalize on unused leisure time; and it is a very effective method to encourage home ownership. This booklet is an analysis of the procedures for establishing a program of aided self-help in housing improvement in developing countries.

PB-286 435/3 PC A10/MF A01
National Planning Association, Washington, DC.
Le Developpement de l'Entreprise Privee Africaine (The Development of African Private Enterprise)
Planning pamphlet no. 120.
Mar 64, 218p
Text in French.

Keywords: *Industrial development, *Africa, Businesses, Industries, Services, Distributing, Foreign government, Europe, United States, Foreign aid, Economic surveys, Developing country application, Private enterprise.

The study concentrates primarily upon African private enterprise in industry, distribution, and the service trades. It analyzes the main problems which impede the emergence and development of modern forms of indigenous private economic activity in the countries of tropical Africa, and describes the measures for mitigating them which could be undertaken by African entrepreneurs themselves, by their government, by the Europeans, Americans, and other private companies operating in Africa and by those providing aid to African countries. The purpose of this study is to present a reasonably comprehensive survey of the present problems and future prospects of African private enterprise.

PB-286 436/1 PC A13/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Manuel d'Horticulture Tropicale et Sub-Tropicale (Handbook of Tropical and Subtropical Horticulture)
Ernest Mortensen, and Ervin T. Bullard. Jun 70, 283p
Text in French.

Keywords: *Vegetables, *Fruits, Fruit crops, Vegetable crops, Trees(Plants), Horticulture, *Tropical regions, Manuals, Fertilizing, Plant growth, Temperature,

Insect control, Handbooks, Soil properties, Planting, Spacing, Weed control, Tables(Data), Insecticides, Subtropical regions, Developing country application.

This manual is written in layman's language in solving their agriculture problems. Major fruit, nut, and tree crops are discussed with emphasis on spacing, pruning, fertilizing, budding, and disease and insect control. A description is given of all major vegetables. Information is presented on seed storage, vegetable varieties, fertilizer recommendations, plants spacings, temperature requirements, soil and cultivation. Major diseases with their control are presented in a table for easy reference.

PB-286 437/9 PC **A09**/MF **A01**
Agency for International Development, Washington, DC. Office of Science and Technology.
Handbook of Tropical and Subtropical Horticulture
Ernest Mortensen, and Ervin T. Bullard. Jun 70, 197p

Keywords: *Fruits, *Vegetables, Fruit crops, Vegetable crops, Trees(Plants), Horticulture, Tropical regions, Manuals, Fertilizing, Plant growth, Temperature, Insect control, Plant diseases, Handbooks, Soil properties, Planting, Spacing, Weed control, Tables(Data), Insecticides, Subtropical regions, Developing country application.

This manual is written in layman's language in solving their agriculture problems. Major fruit, nut, and tree crops are discussed with emphasis on spacing, pruning, fertilizing, budding, and disease and insect control. A description is given of all major vegetable varieties, fertilizer recommendations, plants spacings, temperature requirements, soil and cultivation. Major diseases with their control are presented in a table for easy reference. (Color illustrations will be reproduced in black and white)

PB-286 438/7 PC **A03**/MF **A01**
Department of Agriculture Extension Service, Washington, DC.
L'Alimentation Sanitaire des Bebes en Milieu Tropical (Health Education of the Tropical Mother in Feeding Her Young Child)
Derrick B. Jelliffe, and John F. Bennett. 1964, 38p
Text in French.

Keywords: Nutrition, Diets, Nutritional deficiency diseases, Tropical regions, Developing countries, Preventive medicine, Infants, *Children, Sanitation, Mothers, *Health education, Developing country application.

Malnutrition in early childhood is the dominant problem in the developing tropical regions of the world, and, although poverty is often a vital causative factor, frequently a considerable proportion of the malnutrition seen is potentially avoidable, if already available local food resources were used to better purpose by parents. An important global target for health education is to persuade tropical mothers to feed their children in the early years of life as well as is possible with already existing available local foods. This paper is largely concerned with the education of the mother in preventing malnutrition among underprivileged children. Topics covered include: breast feeding vs. artificial feeding, the transitional diet, and the adult diet.

PB-286 439/5 PC **A03**/MF **A01**
Makerere Medical School, Kampala (Uganda). Dept. of Preventive Medicine.
Health Education of the Tropical Mother in Feeding Her Young Child
Derrick B. Jelliffe, and John F. Bennett. 1964, 27p

Keywords: Nutrition, Diets, Nutritional deficiency diseases, Tropical regions, Developing countries, Preventive medicine, Infants, *Children, Sanitation, Mothers, *Health education, Developing country application.

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PB-286 440/3 PC **A09**/MF **A01**
National 4-H Tractor Program's Extension Sub-Committee.
L'Entretien Des Tracteurs (4-H Tractor Program Learning by Doing. A Units, p1-90)
1978, 194p
Text in French.

Keywords: *Agricultural machinery, Tractors, Maintenance, Tractor engines, Spark ignition engines, Diesel engines, Lubrication, Carburetors, Ignition systems, Cooling systems, Safety, Instructional materials, Developing country application.

This booklet is a guide to learning the basic mechanics of tractor care which will help prevent costly breakdowns and provide greater productivity. The areas discussed in the book are tractor safety, general lubrication, oil for the engine and hydraulic system, air cleaners, carburetor adjustment, the ignition, and the cooling system. A cross-section of the gas engine is shown and discussed. It also tells how to keep a complete written record of all operating, maintenance, and repair costs of your tractor.

PB-286 441/1 PC **A05**/MF **A01**
National 4-H Tractor Program's Extension Sub-Committee.
4-H Tractor Program Learning by Doing. A Units. Tractor Care Project
1978, 86p

Keywords: *Agricultural machinery, Tractors, Maintenance, Tractor engines, Spark ignition engines, Diesel engines, Lubrication, Carburetors, Ignition systems, Cooling systems, Safety, Instructional materials, Developing country application.

This booklet is a guide to learning the basic mechanics of tractor care which will help prevent costly breakdowns and provide greater productivity. The areas discussed in the book are tractor safety, general lubrication, oil for the engine and hydraulic system, air cleaners, carburetor adjustment, the ignition, and the cooling system. A cross-section of the gas engine is shown and discussed.

PB-286 442/9 PC **A04**/MF **A01**
National 4-H Tractor Program's Extension Sub-Committee.
4-H Tractor Program Learning by Doing. B Units. Tractor Care Project
1978, 69p
Sponsored in part by American Oil Co., New York, and Agency for International Development, Washington, DC.

Keywords: *Agricultural machinery, Tractors, Maintenance, Tractor engines, Spark ignition engines, Ignition systems, Manual transmissions, Valves, Steering gear, Instructional materials, Developing country application.

The purpose of this booklet is to provide an opportunity to learn the proper care of a tractor which will result in longer life, more power, and lower operating costs. This booklet makes it possible for you to learn how to do many small tractor maintenance jobs that will give you greater production and help to eliminate costly breakdowns. Topics covered include: engine ignition systems, fuel saving adjustments, valves, power transmissions, care of tires, and steering and front wheels.

PB-286 444/5 PC **A13**/MF **A01**
Agency for International Development, Washington, DC.
Petites Conserveries. (Small Canning Factories)
Mar 72, 295p
Text in French.

Keywords: *Food processing, Canning, Manuals, *Industrial plants, Site selection, Buildings, Plant layout, Requirements, Small businesses, Planning, Technical assistance, Developing country application.

The manual is a comprehensive collection of information on the canning of food. The manual is divided into three sections. The first section explains the many desirable results of canning and the factors which are necessary to make the establishment of a canning plant a practical venture. The second section discusses the selection of the plant site, the building requirements, and the layout of the equipment in the plant. The last section deals with the various procedures involved in canning.

PB-286 445/2 PC **A12**/MF **A01**
Agency for International Development, Washington, DC.
Small Canning Factories
Mar 72, 275p

Keywords: *Food processing, Canning, Manuals, *Industrial plants, Site selection, Buildings, Plant layout, Requirements, Small businesses, Planning, Technical assistance, Developing country application.

The manual is a comprehensive collection of information on the canning of food. The manual is divided into three sections. The first section explains the many desirable results of canning and the factors which are necessary to make the establishment of a canning plant a practical venture. The second section discusses the selection of the plant site, the building requirements, and the layout of the equipment in the plant. The last section deals with the various procedures involved in canning.

PB-286 446/0 PC **A03**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Managing Public Rangelands: Effective Livestock Grazing Practices and Systems for National Forests and National Grasslands
Richard S. Driscoll. Oct 67, 37p Rept no. AIB-315

Keywords: *Animal husbandry, *Forestry, Livestock, Grazing land, National parks, Forest land, Management, Vegetation, Selection, Forage grasses, Water supply, Ponds, Feeding stuffs, Grassland, Animal nutrition, Range grasses, Fences, Developing country application.

This brochure presents the basic principles of various grazing practices that might be used in forests and grasslands. Topics discussed in this pictorial booklet include: salting, fencing, water development, and riding and herding.

PB-286 447/8 PC **A03**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
L'Exploitation des Paturages (Managing Public Rangelands: Effective Livestock Grazing Practices and Systems for National Forests and National Grasslands)
Richard S. Driscoll. Oct 67, 38p
Text in French.

Keywords: *Forestry, *Animal husbandry, Livestock, Grazing land, National parks, Forest land, Management, Vegetation, Selection, Forage grasses, Water supply, Ponds, Feeding stuffs, Grassland, Animal nutrition, Range grasses, Fences, Developing country application.

This brochure presents the basic principles of various grazing practices that might be used in forests and grasslands. Topics discussed in this pictorial booklet include: salting, fencing, water development, and riding and herding.

PB-286 448/6 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of International Housing.
L'Amenagement de Marches Ruraux en Afrique (Village Markets in Ghana: A Study on the Planning of Village Markets and Stalls)
Ideas and methods exchange no. 60
William Mann, Jr. Oct 63, 37p
Text in French.

Keywords: *Technical assistance, *Marketing, Ghana, Facilities, Construction, Community development, Information, Mass communication, Culture(Social sciences), Developing countries, Guidelines, Villages, Developing country application, Markets.

Village markets provide a great variety of necessities and luxury items to a majority of the population as well

as being a center for social interaction, mass communication, and the diffusion of culture. This booklet has been written to help preserve the traditional spirit of village markets, to improve the physical make-up to better serve their intended purpose, and to offer suggestions for making them more pleasant and healthful as human surroundings. The booklet is illustrated for increased understanding.

PB-286 449/4 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Office of International Housing.
Village Markets in Ghana: A Study on the Planning of Village Markets and Stalls
Ideas and methods exchange
William Mann, Jr. May 65, 49p Rept no. IME-60

Keywords: *Technical assistance, *Marketing, *Ghana, Facilities, Construction, Planning, Sanitation, Distribution systems, Culture(Social sciences), Developing countries, Mass communication, Guidelines, Villages, Markets, Developing country application.

Village markets provide a great variety of necessities and luxury items to a majority of the population as well as being a center for social interaction, mass communication, and the diffusion of culture. This booklet has been written to help preserve the traditional spirit of village markets, to improve the physical make-up to better serve their intended purpose, and to offer suggestions for making them more pleasant and healthful as human surroundings. The booklet is illustrated for increased understanding.

PB-286 450/2 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Comment Conserver le Poisson Salage-Sechage-Fumage (Home Curing Fish. A Guide for Extension and Village Workers in Many Countries)
Jul 67, 41p
Text in French.

Keywords: *Food processing, *Fishes, Instructional materials, Developing countries, Guidelines, Technical assistance, Cleaning, Drying, Smoking, Curing, Villages, Developing country applications.

The information in the booklet presents ideas on how to catch and cure fish at home. The various topics discussed are catching and handling fish, how to clean fish, salting fish, how to air dry fish, how to smoke fish, and how to use cured fish.

PB-286 451/0 PC A02/MF A01
Department of Agriculture Extension Service, Washington, DC.
Home Curing Fish. A Guide for Extension and Village Workers in Many Countries
Jul 67, 21p

Keywords: *Food processing, *Fishes, Instructional materials, Developing countries, Guidelines, Technical assistance, Cleaning, Drying, Smoking, Curing, Villages, Developing country applications.

The information in the booklet presents ideas on how to catch and cure fish at home. The various topics discussed are catching and handling fish, how to clean fish, salting fish, how to air dry fish, how to smoke fish, and how to use cured fish.

PB-286 452/8 PC A04/MF A01
National Association of Home Builders, Washington, DC.
Le Beton: Principes Elementaires (Basics of Concrete)
Ideas and methods exchange no. 49.
Nov 60, 64p
Text in French.

Keywords: *Concrete, Air entrained concretes, Portland cements, Concrete construction, Masonry cements, Prestressed concrete, Ready mixed concrete, Concrete finishing, Admixtures, Developing country applications.

Concrete when properly prepared and used, is one of the most versatile of building materials, and is used to some extent throughout the world in the production of housing. Failures occur when the simple rules essential to the production of good quality buildings of concrete or concrete products are ignored. This pictorial booklet consists of a series of articles on good practice in the preparation and use of concrete and concrete masonry.

PB-286 454/4 PC A07/MF A01
Agency for International Development, Washington, DC.
Education in Health
1964, 126p

Keywords: *Health education, Public health, Sanitation, Meetings, Schools, Children, Instructors, Health care services, Instructional materials, Attitudes, Developing country application.

The material in this publication presents the group thinking of many health workers of various professional skills, who participated in a health conference in the Philippines. This report is designed as a training aid and handy reference for the use of health workers everywhere. The functions of the health educator and public administrator in the prevention and treatment of malaria are discussed as well as the importance of educating people in the area of sanitation. The role of the health educator and public administrator in establishing a school health program to teach children and school personnel to attain and maintain good health are discussed. Methods of dealing with community attitudes in maternal and child care are explained.

PB-286 455/1 PC A07/MF A01
Agency for International Development, Washington, DC.
L'Education Sanitaire (Education in Health)
1964, 144p
Text in French.

Keywords: *Health education, Public health, Sanitation, Meetings, Schools, Children, Instructors, Health care services, Instructional materials, Attitudes, Developing country application.

The material in this publication presents the group thinking of many health workers of various professional skills, who participated in a health conference in the Philippines. This report is designed as a training aid and handy reference for the use of health workers everywhere. The functions of the health educator and public administrator in the prevention and treatment of malaria are discussed as well as the importance of educating people in the area of sanitation. The role of the health educator and public administrator in establishing a school health program to teach children and school personnel to attain and maintain good health are discussed. Methods of dealing with community attitudes in maternal and child care are explained.

PB-286 456/9 PC A03/MF A01
West Pakistan Range Improvement Scheme, Lahore.
Water Spreading Manual
Range management record no. 1
Norman H. French, and Ijaz Hussain. May 64, 46p

Keywords: *Irrigation, Dikes, Earth dams, *Water supply, Agricultural economics, Manuals, Deserts, Farm crops, Semiarid land, Forage grasses, Runoff, Flooding, Ponds, Design, Channel flow, Topography, Slopes, Water law, Ditches, Construction, Maintenance, Pakistan, Developing country application, Water spreading, Peak discharge.

Water spreading both for crop production and the production of additional forage for livestock has a real and practical application in many places. This booklet provides adequate knowledge to technicians for embarking upon such a project. Photographs and illustrations make this booklet an easily read and practical guide. (Color illustrations reproduced in black and white)

PB-286 457/7 PC A04/MF A01
West Pakistan Range Improvement Scheme, Lahore.
Irrigation par Deversement (Water Spreading Manual)
Range management record no. 1
Norman H. French, and Ijaz Hussain. May 64, 58p
Text in French.

Keywords: *Irrigation, Dikes, Earth dams, *Water supply, Agricultural economics, Manuals, Deserts, Farm crops, Semiarid land, Forage grasses, Runoff, Flooding, Ponds, Channel flow, Design, Topography, Slopes, Water law, Ditches, Construction, Maintenance, Pakistan, Developing country application, Water spreading, Peak discharge.

Water spreading both for crop production and the production of additional forage for livestock has a real and practical application in many places. This booklet provides adequate knowledge to technicians for embarking upon such a project. Photographs and illustrations make this booklet an easily read and practical guide.

PB-286 459/3 PC A13/MF A01
Caribbean Food and Nutrition Inst., Kingston (Jamaica).
La Nutrition de L'Enfant Dans les Pays en Voie de Development (Child Nutrition in Developing Countries)
Derrick B. Jelliffe. 1968, 281p
Text in French.

Keywords: *Food services, Developing countries, Nutrition, *Children, Nutritional deficiency diseases, Diets, Foreign countries, Therapy, Preventive medicine, Humans, Food, Education, Indexes(Documentation), Developing country application.

In recent years international recognition has accumulated to emphasize the magnitude of the problem of childhood nutrition. This handbook will help nontechnical workers recognize the significance of the problem of malnutrition in young children and help guide their efforts toward locally appropriate preventative and curative measures.

PB-286 460/1 PC A13/MF A01
Caribbean Food and Nutrition Inst., Kingston (Jamaica).
Child Nutrition in Developing Countries
Derrick B. Jelliffe. 1968, 279

Keywords: *Food services, Developing countries, Nutrition, *Children, Nutritional deficiency diseases, Diets, Foreign countries, Therapy, Preventive medicine, Humans, Food, Education, Indexes(Documentation), Developing country application.

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PB-286 461/9 PC A03/MF A01
Agency for International Development, Washington, DC.
Developpement Communautaire - Cinq Realisations Interessantes en Afrique (Five Community Development Stories Out of West Africa; Community Development Series, Volume 1, Series B)
Nov 62, 42p
Text in French.

Keywords: *Community development, *Africa, Planning, Improvement, Water wells, Irrigation, Farm crops, Rice, Ghana, Nigeria, Lagos, Construction, Developing countries, Villages, Developing country application.

These five development success stories may inspire efforts to improve the living conditions in villages. Local participation in planning and carrying out improvements obtained good results. Successful deep wells were dug in Patuduase and Apam, Ghana, and a popular literacy compaign completed. In northern Ghana, villages built their own irrigation system for rice growing under the tutelage of development personnel. In Igan Alada, Nigeria, the villagers were inspired to build themselves an auditorium, and in Lagos, a youth club was established which was then used in self-help schemes.

PB-286 464/3 PC A06/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Manuel Pratique de l'Equipement Rural (III). Installations Sanitaires (Village Technology Handbook)
Jun 63, 116p
Text in French.

Keywords: *Housing, Tools, *Technical assistance, Handbooks, Developing countries, *Agriculture, *Water supply, Health, Sanitation, Houses, Construction, Improvement, Developing country application, Villages.

The handbook has been prepared to assist village workers of developing countries in making useful tools and in acquiring helpful work techniques. It contains fifty articles that describe and illustrate various tools and techniques primarily in the fields of agriculture, water supply, sanitation and health, housing and construction, and home improvement.

PB-286 465/0 PC A06/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Manuel Pratique de L'Equipment Rural L'Eau au Village (Village Technology Handbook, First Edition, Pages 1-81)
Jun 63, 103p
Text in French.

Keywords: Tools, Handbooks, *Technical assistance, Developing countries, *Water supply, Technology, Community development, Irrigation, Artesian wells, Potable water, Villages, Developing country application.

The handbook has been prepared to assist village workers of developing countries in making useful tools and in acquiring helpful work techniques. It contains twenty-four articles that describe and illustrate various tools and techniques in the field of water supply, irrigation, potable water, chlorination of polluted water, drilling of wells, piping and drainage and similar subjects. (Portions of this document are not fully legible)

PB-286 467/6 PC A15/MF A01
National Research Council, Washington, DC.
L'Energie et le Developpement Rural: Ressources Renouvelables et Options Techniques pour les Pays en Developpement (Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries)
1977, 331p
Contract AID/csd-2584
Text in French.

Keywords: *Wind energy, *Solar energy, Developing countries, Rural areas, Regional planning, Wind power generation, Biomass, Energy storage, Reviews, Reviewing, *Energy source development, Solar energy conversion, *Bioconversion, Wind power utilization, *Hydroelectric power, Photosynthesis, *Geothermal energy, Developing Country Application, State of the art.

This report provides a summary of the state of the art of alternative (appropriate or soft) technologies frequently suggested as solutions to rural or individual-family energy needs. Moreover, it informs both the technologist and the planner where to go for more detailed information and what kinds of research and development are needed before a particular device or process is ready for use. Thus, it should be of considerable assistance in evaluating the potential of each energy source in each candidate situation. This is the French edition of the original report which was printed in 1976.

PB-286 469/2 PC A04/MF A01
Wood (Richardson) and Co., New York.
Plant Requirements Primer: How to Start a New Factory or Shop
Aug 55, 61p

Keywords: *Management planning, Technical assistance, Businesses, Planning, Industrial plants, Shops, Manufacturing, Workplace layout, Materials, Equipment, Personnel, Operating costs, Marketing, Sales, Capital, Profits, Instructional materials, *Small businesses, Industrial growth, Industrial development, Developing country application.

The pictorial pamphlet outlines steps that should be followed in starting a new factory or shop. Its purpose is to show how ideas for a new business should be collected and presented to obtain the greatest cooperation from lending agencies, other businessmen, and from the Government. The pamphlet first shows in brief pictorial form the types of privately owned enterprises that have often been started in countries with developing industries. It then discusses the processes of industrial development and the general conditions that are necessary to industrial growth. The last section describes in some detail a typical case of a preliminary study of a new business enterprise which could culminate in its actual establishment.

PB-286 470/0 PC A04/MF A01
Wood (Richardson) and Co., New York.
Comment Creer Une Usine (Plant Requirements Primer: How to start a New Factory or Shop)
Aug 55, 74p
Text in French.

Keywords: *Management planning, Technical assistance, Businesses, Planning, Industrial plants, Shops, Manufacturing, Workplace layout, Materials equipment, Personnel, Operating costs, Marketing, Sales, Capital, Profits, Instructional materials, *Small businesses, Industrial growth, Industrial development, Developing country application.

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PB-286 471/8 PC A03/MF A01
Agency for International Development, Washington, DC.
Power Transmissions for Cottage Industry
1978, 40p

Keywords: *Power equipment, *Small businesses, Industries, Rural areas, Belt drives, Power transmission belts, Power supplies, Mechanical drives, Pulleys, Belts, Machine tools, Quality of life, Developing country application, Cottage industries.

This booklet covers the various methods of transmission of mechanical power from its source to the driven member, and the various companion devices which go to make up a suitable power transmission. The transmission elements described are limited to the simple materials which are available locally at little or no cost. Reference is made to the various sources of power which may be available in an area and to the relative economics and practicality of these sources. Only the type of equipment is discussed which may be improvised by rudimentary techniques from simple materials.

PB-286 472/8 PC A03/MF A01
Agency for International Development, Washington, DC.
Les Transmissions de Force Motrice Dans L'Artisanat Familial (Power Transmissions for Cottage Industry)
1978, 50p
Text in French.

Keywords: *Power equipment, *Small businesses, Industries, Rural areas, Belt drives, Power transmission belts, Power supplies, Mechanical drives, Pulleys, Belts, Machine tools, Quality of life, Developing country application, Cottage industries.

This booklet covers the various methods of transmission of mechanical power from its source to the driven member, and the various companion devices which go to make up a suitable power transmission. The transmission elements described are limited to the simple materials which are available locally at little or no cost. Reference is made to the various sources of power which may be available in an area and to the relative economics and practicality of these sources. Only the type of equipment is discussed which may be improvised by rudimentary techniques from simple materials.

PB-286 473/4 PC A03/MF A01
Philco Corp., Philadelphia, PA. Technical Publications Dept.
Kerosene Devices. Technical Digest Supplement No. 8
Jan 61, 47p

Keywords: *Kerosene, Burners, Heating equipment, Lamps, Refrigerators, Safety, Combustion, Space heaters, Water heaters, Developing country application.

The report deals with the basic principals and applications of kerosene fueled devices. It is directed primarily to those who wish to become involved with the manufacture or maintenance. Emphasis is on kerosene devices intended for domestic use (heaters, lamps, refrigerators, etc.).

PB-286 474/2 PC A04/MF A01
Philco Corp., Philadelphia, PA. Technical Publications Dept.
Appareils a Kerosene (Kerosene Devices)
Jan 61, 69p
Text in French.

Keywords: *Kerosene, Burners, Heating equipment, Lamps, Refrigerators, Safety, Combustion, Space heaters, Water heaters, Developing country application.

The report deals with the basic principals and applications of kerosene fueled devices. It is directed primarily to those who wish to become involved with the manufacture or maintenance. Emphasis is on kerosene devices intended for domestic use (heaters, lamps, refrigerators, etc.).

PB-286 475/9 PC A14/MF A01
Stanford Research Inst., Menlo Park, CA.
Manual of Industrial Development
Jun 58, 320p

Keywords: Economic development, Developing countries, Manufacturing, Industries, Economic analysis, Methods, Productivity, Manuals, Demand(Economics), Resources, Stability, Balance of payments, Capital, Income, Experience, Competition, Community relations, Attitudes, *Industrial development, Industrialization, Economic status, Developing country application, Per capita income, Social attitudes.

It is the purpose of the manual to contribute to the economic progress of developing countries by helping them deal more effectively with some of the crucial development decisions that must be made. It deals with the problem of making a rational selection of specific types of manufacturing industries likely to be most effective in raising the productivity and the living level of an area under development. The manual does this by proposing a method of analysis rather than by analyzing the industrial development opportunities and problems of a particular country or region.

PB-286 476/7 PC A11/MF A01
Stanford Research Inst., Menlo Park, CA.
Un Facteur du Developpement Economique la Selection des Industries. (Manual of Industrial Development)
Jun 58, 246p
Text in French.

Keywords: Economic development, Developing countries, Manufacturing, Industries, Economic analysis, Methods, Productivity, Manuals, Demand(Economics), Resources, Stability, Balance of payments, Capital, Income, Experience, Competition, Community relations, Attitudes, *Industrial development, Industrialization, Economic status, Developing country application, Per capita income, Social attitudes.

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PB-286 477/5 PC A03/MF A01
Farm Credit Administration, Washington, DC.
Farm Credit Manual
A. Rudolph Ettesvold. May 66, 35p

Keywords: Agriculture, Credit, Manuals, *Agricultural economics, Financing, Farms, Real property, Working capital, Capital, Payment, Education, Personnel, Projects, Credit policies, Capital expenditures, Short term financing, Long term financing, Capital improvements, Finance occupations.

The manual has been prepared for the purpose of stating as simply as possible the basic principles of sound agricultural credit. These basic principles have proved to be sound and are applicable in all countries, regardless of the stage of development of their agricultural credit systems. The manual should be useful as a basis for establishing or extending training programs in all countries where an agricultural credit program is in operation or is being contemplated.

PB-286 560/8 PC A99/MF A01
Wisconsin Univ.-Madison.
Management of Small Waste Flows
Final rept. Jul 71-Jun 77.
Sep 78, 854p* EPA/600/2-78/173
Grant EPA-R-802874

Keywords: Sewage disposal, *Sewage treatment, Constraints, Law(Jurisprudence), Residential buildings, *Waste water, Industrial wastes, Assessments, Soil properties, Microbiology, Sand filtration, *Septic tanks, Cost analysis, Sanitation, Fluid infiltration, Design, Operations, Management, Bacteria, Sites, *Waste treatment, Alternative planning.

This report is a compilation of laboratory and field investigations conducted at the University of Wisconsin since 1971. As its primary objective, the research program was to conceive, evaluate and develop satisfactory methods for the on-site treatment and disposal of wastewaters, regardless of the site constraints. The studies were subdivided into several categories including characterization of household and commercial wastewaters, assessment of wastewater treatment alternatives, evaluation of soils for treatment and disposal of wastewater, estimation of infiltrative capacities of soils, design and operation of alternative systems dependent upon soil design and operation of alternative systems not dependent upon soil, management of on-site disposal systems and institutional and regulatory control of on-site systems.

PB-286 572/3 PC A03/MF A01
Farm Credit Administration, Washington, DC.
Manuel de Credit Agricole. (Farm Credit Manual)
A. Rudolph Ettesvold. May 66, 41p
Text in French.

Keywords: Agriculture, Credit, Manuals, *Agricultural economics, Financing, Farms, Real property, Working capital, Capital, Payment, Education, Personnel, Projects, Credit policies, Capital expenditures, Short term financing, Long term financing, Capital improvements, Finance occupations.

The manual has been prepared for the purpose of stating as simply as possible the basic principles of sound agricultural credit. These basic principles have proved to be sound and are applicable in all countries, regardless of the stage of development of their agricultural credit systems. The manual should be useful as a basis for establishing or extending training programs in all countries where an agricultural credit program is in operation or is being contemplated.

PB-286 573/1 PC A03/MF A01
Farm Credit Administration, Washington, DC.
Lending to Increase Farmer's Income. A Series of Guides to Effective Use of Agricultural Credit
Jun 58, 31p

Keywords: Agriculture, Financing, Specialized training, Personnel development, Financial management, Credit, Income, Farms, Risk, Real property, Farm crops, Services, Projects, *Agricultural economics, *Training, Credit policies, Economic risks, Financial services, Finance occupations, Guides.

The booklet's purpose is to provide training material and encourage the development of more intensive training programs for officials and employees of agricultural credit organizations in other countries. The sections discussed in the booklet include: the man who needs credit, purposes for which loans are made, capacity of the farm to pay debts, financial strength and progress of the borrower, property and growing crops as security for loans, and loan supervision and collections.

PB-286 574/9 PC A03/MF A01
Farm Credit Administration, Washington, DC.
Le Credit Agricole Source de Prosperite (Lending to Increase Farmer's Income. A Series of Guides to Effective Use of Agricultural Credit)
Jun 58, 50p
Text in French.

Keywords: Agriculture, Financing, Specialized training, Personnel development, Financial management, Credit, Income, Farms, Risk, Real property, Farm crops, Services, Projects, *Agricultural economics, *Training, Credit policies, Economic risks, Financial services, Finance occupations, Guides.

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PB-286 576/4 PC A05/MF A01
Bureau of Labor Statistics, Washington, DC. Div. of Foreign Labor Conditions.
La Prevision Des Besoins en Main-D'Oeuver (The Forecasting of Manpower Requirements)
Matilda R. Sugg, and Lloyd A. Prochnow. 1968, 96p
Text in French.

Keywords: Manpower, Requirements, Forecasting, Developing countries, Demographic surveys, Methods, Populations, Population growth, Statistical analysis, Economic development, Education, *Management techniques, Manpower development programs, Population dynamics, Labor force estimates, Occupational surveys, Developing country application.

The handbook has been written to assist economists and statisticians in the economically developing countries in initiating and conducting studies for determining future manpower requirements in relation to anticipated development. It outlines a method of estimating future manpower requirements by occupation and industry and future training requirements for high-level occupations.

PB-286 578/0 PC A04/MF A01
Farmer Cooperative Service, Washington, DC.
Les Cooperatives Agricoles aux Etats-Unis (Rural Cooperatives in the United States)
Apr 63, 64p
Text in French.

Keywords: Economics, Cooperation, Rural areas, Commerce, States(United States), Organizations, Economic development, Agricultural economics, Rural sociology, History, Legislation, Services, Businesses, *Agricultural cooperatives, United States, Cooperatives, Rural economics, Economic cooperation, Cooperative enterprises, Cooperative production and marketing systems.

Cooperatives have longed played a significant role in the developing economy of the United States. The booklet describes the evolution of rural cooperatives in the United States and discusses the many benefits of cooperatives as well as mistakes to avoid.

PB-286 579/8 PC A02/MF A01
Department of Agriculture Extension Service, Washington, DC.
Building a Strong Extension Service. A Guide for Extension Administrators
Fred Jans. Jul 69, 17p

Keywords: Federal assistance programs, Rural areas, Management training, Education, Agricultural economics, Economic development, Rural sociology, Financing, Production, Organization theory, Personnel development, Planning, *Agricultural extension services, Administrator guides, Rural extension, Rural farm residents, Agricultural production, Developing country application, Administrative personnel, Rural development, Organizational development.

The purpose of agricultural extension is to carry the application of science in the fields of agricultural production and family living to people who use the lands regardless of their educational level or stage in life. It also provides a good channel through which practical problems important to farm people are called to the attention of research institutions. The bulletin discusses some of the fundamental steps essential in establishing an effective extension service. It has been prepared by recognized leaders experienced in this field.

PB-286 580/6 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Creation d'Un Service de Vulgarisation Agricole (Building a Strong Extension Service. A Guide for Extension Administrators)
Fred Jans. 1969, 34p
Text in French.

Keywords: Federal assistance programs, Rural areas, Management training, Education, Agricultural economics, Economic development, Rural sociology, Financing, Production, Organization theory, Personnel development, Planning, *Agricultural extension services, Administrator guides, Rural extension, Rural farm residents, Agricultural production, Developing country application, Administrative personnel, Rural development, Organizational development.

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PB-286 581/4 PC A09/MF A01
Bureau of Employment Security, Washington, DC.
Establishment of National Employment Services in Developing Countries
Sep 68, 197p

Keywords: *Employment, Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries, Employment services, Labor force, Developing country application.

This handbook is for those who undertake assignments to assist under-developed countries establish or improve their employment services. The handbook lists in logical sequence, the principal steps which would be involved in starting an employment service from the ground up. Recognizing that there may be situations in which placement service is not required but where other employment services may be, it suggests that these may be provided in other ways than in opening costly local employment offices to accomplish the purpose.

PB-286 582/2 PC A12/MF A01
Bureau of Employment Security, Washington, DC.
El Servico Publico de Empleos (Establishment of National Employment Services)
1967, 258p
Text in Spanish.

Keywords: *Employment, Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries, Employment services, Labor force, Developing country application.

This handbook is for those who undertake assignments to assist under-developed countries establish or improve their employment services. The handbook lists in logical sequence, the principal steps which would be involved in starting an employment service from the ground up. Recognizing that there may be sit-

uations in which Placement Service is not required but where other employment services may be, it suggests that these may be provided in other ways than in opening costly local employment offices to accomplish the purpose. (Portions of this document are not fully legible)

PB-286 583/0 PC A10/MF A01
Bureau of Employment Security, Washington, DC.
Les Services Publics de l'Emploi (Establishment of National Employment Services in Developing Countries)
Sep 78, 204p
Text in French.

Keywords: *Employment, Services, Consultants, Handbooks, Job analysis, Placement, Manpower, Specialized training, Skilled workers, Developing countries, Employment services, Labor force, Developing country application.

This handbook is for those who undertake assignments to assist under-developed countries establish or improve their employment services. The handbook lists in logical sequence, the principal steps which would be involved in starting an employment service from the ground up. Recognizing that there may be situations in which Placement Service is not required but where other employment services may be, it suggests that these may be provided in other ways than in opening costly local employment offices to accomplish the purpose.

PB-286 585/5 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Mejoramiento de la Vivienda por Autoayuda Subsidiada (Aided Self-Help in Housing Improvement)
Ideas and methods exchange no. 18
E. Douglas Stone, George A. Spear, Jacob L. Crane, Roy J. Burroughs, and J. Robert Dodge. Sep 68, 43p
Text in Spanish.

Keywords: Houses, Improvement, Upgrading, Guidelines, Technical assistance, Developing countries, *Housing, Self help, Self help housing, Developing country application, Home ownership.

Aided self-help is the concept of self-help plus some form of aid so as to achieve an improved product. It is a principle which is adaptive to a variety of techniques and situations; it may capitalize on unused leisure time; and it is a very effective method to encourage home ownership. This booklet is an analysis of the procedures for establishing a program of aided self-help in housing improvement in developing countries.

PB-286 587/1 PC A09/MF A01
Economic Research Service, Washington, DC. Regional Analysis Div.
Nourrir un Monde Surpeuple. (Man, Land and Food. Looking Ahead at World Food Needs)
Foreign agricultural economic rept.
Lester R. Brown. Nov 63, 180p Rept no. FAER-11-F
Text in French.

Keywords: *Food supply, Populations, Land, Agricultural products, Grains(Food), Production, Technology, Land development, Developing countries, Regions, Food consumption, Commerce, Soybeans, Milk, Tropical regions, *Land use, Population growth, World food, World trade, Developing country application.

The purpose of the study is to add perspective to the world food problem. The analysis seeks to assess the magnitude and direction of the effort which must be made during the remaining four decades of this century if the projected population is to be sustained. Some of the topics discussed are population trends, land resources, agricultural problems, increasing output, and grain production.

PB-286 588/9 PC A08/MF A01
Economic Research Service, Washington, DC. Regional Analysis Div.
Man, Land and Food. Looking Ahead at World Food Needs
Foreign agricultural economic rept.
Lester R. Brown. Nov 63, 162p Rept no. FAER-11

Keywords: *Food supply, Populations, Land, Agricultural products, *Grains(Food), Production, Technology, Land development, Developing countries, Regions, Food consumption, Commerce, Soybeans, Milk, Tropical regions, *Land use, World food, World trade, Developing country application.

The purpose of the study is to add perspective to the world food problem. The analysis seeks to assess the magnitude and direction of the effort which must be made during the remaining four decades of this century if the projected population is to be sustained. Some of the topics discussed are population trends, land resources, agricultural problems, increasing output, and grain production.

PB-286 590/5 PC A04/MF A01
Small Business Administration, Washington, DC. Office of Management and Research Assistance.
Creer et Gerer une Petite Entreprise de Comptabilite (Starting and Managing a Small Bookkeeping Service. The Starting and Managing Series, Volume 4)
Charles H. Sevin. Jan 62, 67p
Text in French.

Keywords: Accounting, Businesses, Management, Services, Operations, Planning, Organizing, Guidelines, *Management planning, Developing country application, *Small businesses, Bookkeeping services.

The booklet is designed to spell out the facts about starting and managing a small bookkeeping service so that the reader can decide if he is suited to it and it to him. Both the advantages and disadvantages are discussed. Included is a guide to operating conditions in that field which spells out common problems and pitfalls as well as potential rewards.

PB-286 591/3 PC A07/MF A01
Small Business Administration, Washington, DC.
Starting and Managing a Small Restaurant. Starting and Managing Series, Volume 9
Paul Fairbrook. Jan 64, 127p
Sponsored in part by National Restaurant Association, Chicago, IL.

Keywords: Technical assistance, Planning, Financing, Management, Abilities, Risk, Profits, Accounting, Food services, Businesses, *Management planning, Restaurants, *Small businesses, Franchising.

The booklet is to help prospective restaurant owners decide whether they have the basic qualifications, financing, and experience for success. It is also intended to supply them with some 'know-how,' help them avoid the pitfalls, and achieve success in case they do enter this field. It describes the advantages and disadvantages of this business, the risks involved, the personal characteristics that will contribute to success, and some of the management practices whose application is necessary for attainment of that success.

PB-286 314/3 PC A06/MF A01
Small Business Administration, Washington, DC.
Creer et Gerer un Petit Restaurant (Starting and Managing a Small Restaurant. The Starting and Managing Series, Volume 9
Paul Fairbrook. Jan 64, 124p
Text in French. Sponsored in part by National Restaurant Association, Chicago, IL.

Keywords: Technical assistance, Planning, Financing, Management, Abilities, Risk, Profits, Accounting, Food services, Businesses, *Management planning, Restaurants, *Small businesses, Franchising.

The booklet is to help prospective restaurant owners decide whether they have the basic qualifications, financing, and experience for success. It is also intended to supply them with some 'know-how,' help them avoid the pitfalls, and achieve success in case they do enter this field. It describes the advantages and disadvantages of this business, the risks involved, the personal characteristics that will contribute to success, and some of the management practices whose application is necessary for attainment of that success.

PB-286 615/0 PC A05/MF A01
Bureau of Labor Standards, Washington, DC. Div. of International Cooperation.
Role of a Labor Department in Developing Countries
Clara M. Beyer. Feb 64, 100p

Keywords: Economic development, Government policies, Developing countries, Handbooks, Organization theory, Technical assistance, Financing, Personnel selection, Public relations, Coordination, Standards, Statistical data, Services, Industrial relations, Manpower development, Sociology, Quality of life, Economics, *Industrial development, Government role, Government services, Information dissemination, Labor standards, Developing country application, Labor economics, Social development.

The document is a handbook for individuals working in the developing countries who may have numerous opportunities to supply information, arrange technical aid, and otherwise help in the strengthening of the labor department as part of a countries' development program. It is designed to give them an understanding of the important role which a labor department plays in social and economic development to make for a better way of life for people in the developing countries. Each of the major services for which a department is normally responsible is briefly described, with the goal of the service, the type of activities carried on, and some of the special problems encountered in developing countries identified for each.

PB-286 616/8 PC A08/MF A01
Bureau of Labor Standards, Washington, DC. Div. of International Cooperation.
Le Role d'Un Ministere du Travail Dans les Pays en Voie de Developpement (Role of a Labor Department in Developing Countries)
Clara M. Beyer. Feb 64, 167

Keywords: Economic development, Government policies, Developing countries, Handbooks, Organization theory, Technical assistance, Financing, Personnel selection, Public relations, Coordination, Standards, Statistical data, Services, Industrial relations, Manpower development, Sociology, Quality of life, Economics, *Industrial development, Government role, Government services, Information dissemination, Labor standards, Developing country application, Labor economics, Social development.

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PB-286 617/6 PC A07/MF A01
Economic Research Service, Washington, DC. Foreign Development and Trade Div.
Changes in Agriculture in 26 Developing Nations, 1948 to 1963
Foreign agricultural economic rept.
Nov 65, 141p Rept no. FAER-27

Keywords: *Agricultural economics, Developing countries, Production, Output, Assessments, Fertilizers, Social change, Farm crops, Demand(Economics), Exports, Marketing, Imports, Transportation, Storage, Food processing, Manpower, Prices, Credit, Tables(Data), *Crops, *Land use, Developing country application.

The agricultural problems of 26 developing nations are considered; 7 of these countries are in Latin America, 4 in Africa, 4 in Europe, 7 in the Near East and South Asia, and 4 in the Far East. The levels and changes since 1948 in agricultural output and productivity in these countries are shown and the roles of major physical, economic, and social factors associated with difference in these levels and changes are identified and assessed. The contents of the study include: sources of change in crop output, land and other natural features, land tenure and size of holdings, technology, the human factor, capital and credit, demand and prices, and marketing facilities and practices.

PB-286 618/4 PC A09/MF A01
Economic Research Service, Washington, DC. Foreign Development and Trade Div.
Evolution de l'Agriculture dans 26 Pays en Voie de Developpement, 1948 a 1963 (Changes in Agriculture in 26 Developing Nations, 1948 to 1963)
Nov 65, 193p
Text in French.

Keywords: *Agricultural economics, Developing countries, Production, Output, Assessments, Fertilizers, Social change, Farm crops, Demand(Economics), Exports, Marketing, Imports, Transportation, Storage, Food processing, Manpower, Prices, Credit, Tables(Data), Developing country application.

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PB-286 621/8 PC A03/MF A01
Department of Health, Education, and Welfare, Washington, DC.
Better Nourishment for Infants and Preschool Children. A Food for Peace Guide
1967, 28p

Keywords: Nutrition, Diets, Food preparation, Infants, *Children, Developing countries, Humans, Nutritional requirements, Tables(Data), Sanitation, *Food products, Mothers.

The purpose of this booklet is to place a practical guide in the hands of those in immediate charge of distributing foods to be consumed by young children in their homes or at community facilities. It is intended to help teach mothers how to use the basic commodity foods together with locally available foods in order to provide the best diet possible within their resources.

PB-286 622/6 PC A03/MF A01
Department of Health, Education, and Welfare, Washington, DC.
Ameliorer L'Alimentation de L'Enfant (Better Nourishment for Infants and Preschool Children. A Food for Peace Guide)
1967, 40
Text in French.

Keywords: Nutrition, Diets, Food preparation, Infants, *Children, Developing countries, Humans, Nutritional requirements, Tables(Data), Sanitation, *Food products, Mothers.

The purpose of this booklet is to place a practical guide in the hands of those in immediate charge of distributing foods to be consumed by young children in their homes or at community facilities. It is intended to help teach mothers how to use the basic commodity foods together with locally available foods in order to provide the best diet possible within their resources.

PB-286 671/3 PC A02/MF A01
National Oceanic and Atmospheric Administration, Washington, D.C. Environmental Data and Information Service.
Harnessing Tidal Energy
Current issue outline.
Aug 78, 15p CIO-78/2, NOAA-78082203

Keywords: Tidal power generation, Electric power generation, Reviewing, Bibliographies, *Tidal energy.

About 3,000,000 megawatts (MW) of power are continuously dissipated through the motion of the tides over the surface of the Earth. Because of physical limitations, only 2% of this may ever be harnessed. This amounts to about 5% of the present worldwide power generation from all sources. Thus, this inexhaustible power source can make a small, but significant, contribution. The background and fundamental principles of tidal power are discussed and recent developments are given. A selected listing of some of the published material relating to electrical power generation from tides is included.

PB-286 674/7 PC A02
Hawaii Univ., Honolulu. Dept. of Business Economics and Quantitative Methods.
Thermal Aquaculture
Richard E. Peterson, and K. K. Seo. 1977, 14p*
UNIHI-SEAGRANT-CP-78-01, NOAA-78082901

Keywords: Cooling water, Thermal pollution, *Aquaculture, Electric power plants, Shellfish, Fishes, Crustacea, Mollusca, Carp, Catfishes, Eels, Lobsters, Mussels, Oysters, Perch, Salmon, Shrimps, Trout, Marine fishes, Reprints, Sea Grant program, *Waste heat utilization.

There now appear to be over 40 demonstration/commercial projects involving the application of thermal waters--often the thermal effluents of electric generating plants--to the aquaculture of fish species. These projects are taking place in several countries, e.g., Canada, England, Iceland, Japan, and the United States (California, Florida, Illinois, Maine, Massachusetts, Minnesota, New Jersey, New York, Oregon, Tennessee, Texas, Washington, and Wisconsin). The crustaceans, mollusks and fishes under culture include carp, catfish, eels, lobsters, mussel, oysters, perch, plaice, salmon, sea bream, shrimp, sole, trout, whitefish, and yellowtail. This paper, based on a literature search and survey replies from sponsoring organizations, operators, and principal investigators, serves the purpose of providing a beginning inventory of current empirical developments in thermal aquaculture.

PB-286 675/4 C A02
Clemson Univ., S.C.
Engineering Considerations in the Aquaculture of 'Macrobrachium rosenbergii' in South Carolina
Paul Zielinski, Walter E. Castro, and Paul A. Sandifer. 1978, 6p NOAA-78082304

Keywords: Shellfish, Fresh water fishes, Crustacea, *Aquaculture, Shrimps, Larvae, Selection, Ponds, Aeration, Performance, Cylindrical bodies, Prototypes, Tanks(Containers), Pumping, Macrobrachium rosenbergii, Sea Grant program, Reprints.

A summary is presented of the progress to date on engineering experimentation involved with the culture of the fresh water prawn, Macrobrachium rosenbergii. The use of large rectangular tanks for treated culture water is possible, using silk mesh screens to separate larvae from the sump zone where the culture water is removed for treatment and returned to the animal portion of the tank. Large cylindrical tanks can be used in a recirculating flow system for larval culture and small cylindrical tanks are currently in use at MRRI. A large tank and system as described here has not been tested with larvae. Similarity laws can be used to predict performance of prototype tanks from the results of model tests. Several desirable and preferred features of the ponds in use in South Carolina for the culture of Macrobrachium shrimp have been identified after three seasons of experience. The operation of an air lift pump at a point of optimal hydraulic performance will also provide maximum aeration efficiency in low lift pumping.

PB-286 700/0 PC A02/MF A01
California Univ., Davis. Water Resources Center
Watercress-Crayfish Polyculture as an Economic Means of Stripping Nutrients from Enriched Waters. Proceedings of the International Symposium Freshwater Crayfish (3rd), Held at Kuopio, Finland on December 1976
J. Rundquist, G. Gall, and C. R. Goldman. 1976, 15p
UCAL-WRC-W-475, OWRT-A-056-CAL(2)

Keywords: *Aquaculture, *Waste water reuse, Crayfishes, *Fisheries, Aquatic plants, Circulation, Inorganic nitrates, Ammonia, Phosphorus, Stripping(Distillation), Proteins, Feeding stuffs, Diets, Growth, Mortality, Economic factors, California, Recycling.

An experimental watercress-crayfish polyculture system is described. The watercress bed receives nutrient-rich effluent from a connecting trout hatchery and effectively strips nitrates, ammonia, and phosphorus from the waters. The harvested watercress also provides a clean and easy food source for crayfish. Preliminary feeding trials indicate that the watercress combined with protein supplement provides a satisfactory crayfish diet in terms of both growth and mortality. The development of watercress-crayfish polyculture is economically promising because of three valuable outputs--cleaner water, watercress, and crayfish.

PB-286 702/6 PC A02/MF A01
California Univ., Davis. Water Resources Center.
The Culture of Crayfish for Waste Recycling and Human Consumption
Completion rept.
Graham A. E. Gall, and Charles R. Goldman. Jun 78, 15p UCAL-WRC-W-475, OWRT-A-056-CAL(5)

Keywords: Trout, Aquaculture, *Waste water reuse, Crayfishes, Fisheries, Circulation, Nutrients, Growth, Dissolved organic matter, Larval, Life cycles, Growth, Temperature, Reproduction(Biology), Nitrogen, Mortality, Diets, Aquatic plants, Phosphorus, California, *Fishes, Recycling.

An experimental watercress-crayfish culture system was developed which received a nutrient-rich effluent from a trout hatchery. The watercress system effectively stripped nutrients from effluent water and provided acceptable growth of watercress. The watercress removed 98% of the nitrate-nitrogen and 92% of the total phosphorous reducing the level of these two nutrients to near the level observed in the hatchery inflow supply. However, there was a significant increase of particulate organic matter in the effluent from the watercress growing-beds. Feeding trials indicated that watercress combined with a protein supplement provides a satisfactory diet for crayfish in terms of both growth rate and mortality. A detailed analysis of the growth of young crayfish from hatching through the fifth molt demonstrated that early growth involves two phases. The optimal temperature for growth appeared to be in the range of 17-22C. A successful system of stripping eggs from the female and hatching them in a drip-type egg incubator was developed which yielded a 90% hatch and normal metamorphosis.

PB-286 722/4 PC A14/MF A01
Oregon State Univ., Corvallis. Agricultural Experiment Station.
Management of Swine Manure for the Recovery of Protein and Biogas
Final rept.
L. Boersma, E. Gasper, J. Miner, J. Oldfield, and H. Phinney. May 78, 309p OAES-SR-507, OWRT-78/12108
Sponsored in part by National Science Foundation, Washington, DC. Applied Science and Research Applications.

Keywords: *Agricultural wastes, Swine, Materials recovery, *Proteins, *Methane, Management planning, Synthetic fuels, Reclamation, Biodeterioration, Algae, Bacteria, Nutrients, Solid waste disposal, Feeding stuffs, Biomass, Anaerobic processes, Tables(Data), *Animal wastes, *Waste recycling, *Bioconversion, Manure, Waste heat utilization, Chlorella vulgaris.

Major findings of an investigation into the concept of nutrient and energy recovery from a swine waste management system are reported. Algae and bacteria were used to convert swine manure into methane-rich fuel gas and supplemental protein for animal feed. Waste heat from electricity generating plants was simulated to test its value in enhancing the biological recovery of nutrients and energy. The experimental facility was built adjacent to the Swine Research Center at Oregon State University and consisted of animal quarters with solid concrete floor and gutter to house 50 pigs, an anaerobic digester with a volume of 14 cu m, and 12 outdoor algae basins with a combined surface area of 24 sq m and a combined volume of 6,000 l. Manure was removed from the animal quarters by a gutter flushing system. The solids were separated from the liquids by gravity settling and then pumped into the digester for solubilization and recovery of biogas. The liquid phase of the diluted manure was pumped into the outdoor basins to serve as nutrient substrate for the growth of the high temperature strain 211/8K of Chlorella vulgaris as the predominant algal species. The algal biomass was concentrated by centrifugation and freeze dried. Its nutritional value as a protein source was determined by feeding trials with Long-Evans rats.

PB-286 782/8 PC A02/MF A01
California Univ., Davis. Div. of Environmental Studies.
Ecological Studies of the California Crayfish, 'Pacifastacus leniusculus', with Emphasis on Their Growth from Recycling Waste Products
Charles R. Goldman, Jane C. Rundquist, and R. Warren Flint. 1974, 11p OWRT-A-056-CAL(3)

Keywords: Animal ecology, Crayfishes, Lake Tahoe, Sacramento River, *Waste water reuse, *Aquaculture, Coasts, Streams, Lakes, Eggs, Reproduction(Biology), Recycling. Pacifastacus leniusculus, Habitats.

This research has two main objectives. The first is an investigation of the ecological role of Pacifastacus leniusculus in its natural habitat such as Lake Tahoe, the Sacramento River, and the coast range streams and lakes. The second objective involves cooperative research around the world as regards intensive crayfish culture. This paper reviews previous work and presents outlook for the two objectives.

PB-288 892/5 PC A02/MF A01
Michigan State Univ., East Lansing. Dept. of Horti-culture.
Trickle Irrigation in Michigan Fruit Plantings
Completion rept. 1 Jul 72-30 Sep 77
A. L. Kenworthy. Jun 78, 16p OWRT-B-029-MICH(1)
Contract DI-14-31-0001-3899

Keywords: Water consumption, Fruit crops, *Irrigation, Apple trees, Peach trees, Berry plants, Field tests, Nitrogen, Fertilizers, Trees(Plants), Size determination, Yield, Volume, Michigan, *Fruits, Trickle irrigation, Cherry trees, Plum trees, Traverse County(Michigan), Leelanau County(Michigan), Ottawa County(Michigan).

Research plots were established on apple, peach, plum, and sour cherry plantings in Grant Traverse County: on sour cherry, sweet cherry and plum in Leelanau County; and on blueberry in Ottawa County. Water application rates were 0, 0.5, 1.0, and 2.0 gallons of water per hour per tree in 1973 and 1974. In 1975 and 1976 the rate was 0, 1.0, 2.0 and 4.0 gph per tree. Duration of irrigation varied with tree size. In 1975, all plots (except blueberry) were subdivided for different rates of nitrogen application through the trickle system. Yield responses indicated that a rate of 2.0 gph was best for all apple cultivars except R. I. Greening, which showed the best response at 4.0 gph. Increase in yield with increased amounts of water was not significant for sour cherry, significant for peach, while plum, sweet cherry and blueberry showed no increase. Nitrogen application test results indicated that the amount of nitrogen could be reduced 50% if applied through the trickle system in June.

PB-286 938/6 PC A08/MF A01
Louisiana Agricultural Experiment Station, Baton Rouge.
Water Quality Renovation of Animal Waste Lagoons Utilizing Aquatic Plants
Final rept. Jul 75-Dec 77
Dudley D. Culley, Jr, James H. Gholson, Tom S. Chisholm, Leon C. Standifer, and Ernest A. Epps. Jul 78, 167p EPA/600/2-78/153
Grant EPA-R-803326

Keywords: Aquatic plants, Lagoons(Ponds), *Agricultural wastes, Water pollution control, Aquaculture, Dairy cattle, Weed control, Yield, Plant growth, Nutrients, Concentration(Composition), Recovery, Ammonium compounds, Proteins, Nitrogen, Phosphorus, Potassium, Standards, *Aquatic weeds, *Animal wastes, *Water quality, Spirodela oligoriza, Spirodela polyrihza, Lemna gibba.

Duckweeds Spirodela oligorhiza, S. polyrhiza, and Lemna gibba (clone G3) grown on dairy waste lagoons gave an estimated maximum annual yield of 22,023 kg dry wt./ha. S. oligorhiza and L. gibba had higher growth rates in the spring, fall, and winter, with L. gibba growing throughout most of the winter. Nutrient content of the plants increased with increasing nutrients in the lagoons. Mean crude protein of dry duckweeds was 36%, to a maximum of 42%. The duckweeds recovered on a hectare basis the N, P, and K of 15.5, 34, and 8.8 lactating cows respectively. During the winter the rate was 1.27 mg/l/day (duckweed lagoons) and 0.82 mg/l/day for controls. Ammonium reduction was 84% greater in the duckweed lagoons during winter. Phosphorus reduction in duckweed lagoons, though significantly different from controls, was insufficient to meet water quality standards.

PB-286 940/2 PC A05/MF A01
Environmental Systems, Inc., Annapolis, MD.
Use of Solar Energy to Heat Anaerobic Digesters. Part I. Technical and Economic Feasibility Study. Part II. Economic Feasibility throughout the United States
Feasibility study 5 Nov 75-1 Jun 76
Jess W. Malcolm, and David E. Cassel. Jul 78, 99p
EPA/600/2-78/114
Contract EPA-68-03-2356

Keywords: Sewage sludge, Anaerobic processes, Solar heating, Digesters, Sludge digestion, Sewage treatment, *Solar collectors, Flat plate collectors, Storage tanks, Heat exchangers, Computer programs, Economic analysis, Geography, Design, Feasibility, Computerized simulation, Energy conservation, Sludge disposal, Solid waste disposal, *Bioconversion, *Waste disposal, *Solar heating systems.

Two distinct, yet related studies were conducted to determine the technical and economic feasibility of using solar energy as the source of heat for the anaerobic digestion process. Retrofitting a solar energy collection and heat transfer system to a digester at Annapolis, Maryland was proven feasible in the first part of the study and the concept of using solar energy for digester heating throughout the United States, including Fairbanks, Alaska, was shown to be economically feasible in the second part of the study. The Part I study compared five (5) types of flat plate collectors and selected the cost effective design to supply approximately 90 percent of the heat load to maintain digester operating temperatures of 32C to 38C. Three flat plate collectors of varying efficiencies were evaluated for use at numerous locations in the United States. The study showed that optimum-sized flat plate collectors can provide from 82 to 97 percent of the total annual digester heat, the higher percentages being applicable to areas of higher solar radiation. The Part II study developed specific guidelines for determining the optimum size and conceptual design for a solar heating system for any size sludge digester at any location.

PB-287 060/8 PC A11/MF A01
Corporacion de Fomento de la Produccion (Chile).
Envases para Alimentos Industrializados Chilenos. Tomo I (Packaging for Chilean Commerical Foodstuffs. Volume I)
Jun 77, 244p
Text in Spanish. Prepared in cooperation with Javier Zaldivar Ingenieros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile).

Keywords: Food packaging, *Chile, Industrial plants, Canning, Bottles, Beverages, Marketing, Exports, Milk, Fruits, Seafood, Rice, Coffee, Sugar crops, Bread, Wines, Sanitary engineering, Design, Quality, Food industry, *Food products, *Packaging, Developing country application.

Results are presented on the status of foodstuff packaging in Chile; marketing projections are tabulated. The study, limited to 33 categories of foodstuffs selected by the three sponsoring agencies, gives recommendations on various aspects of foodstuff packaging for domestic consumption and for export. Research methodology includes questionnaires and summaries of plant visits to canneries, bottlers, supermarkets, retailers, and exporters. Attention is focused upon milk products, fruits, soups, seafood, margarine and fats, rice, coffee, sugar, crackers, chocolates, carbonated beverages, beer, wine, and bread. Metal packaging in many cases is associated with lost labels, denting, difficulty in opening, and inadequate sanitary protection. It was concluded that Chilean packaging compares well with that of other South American countries, but is less varied in form, size, and materials than European and North American countries. Labels do compare well, and in the future they will be more colorful and attractive. Plastic bottles should be more carefully designed in regard to capping to prevent infiltration of foreign matter and spillage. The Chilean government regulates materials, design, size, and sanitary provisions; it utilizes data from the U.S. Food and Drug Administration, as well as from its own experts. Future programs will cover increased automation methods and reduced costs resulting from improved physical distribution methods. (Portions of this document are not fully legible)

PB-287 061/6 PC A10/MF A01
Corporacion de Fomento de la Produccion (Chile).
Envases para Alimentos Industrializados Chilenos. Tomo II (Packaging for Chilean Commerical Foodstuffs. Volume II)
Jun 77, 202p
Text in Spanish. Prepared in cooperation with Javier Zaldivar Ingenieros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile).

Keywords: Food packaging, *Chile, Quality control, Distribution systems, Marketing, Prices, Supply(Economics), *Packaging, Containers, Exports, Regulations, Food industry, *Food products, Developing country application.

Foodstuff packaging in Chile is discussed in terms of quality control, physical distribution, marketing, pricing, supply and demand, and modern technology. Chapter XVI provides plans for creating an institute of packaging and packing: it details budget, staffing, organization, and activities. Topics highlighted are economics of physical distribution of foodstuffs, critical analysis of packaging in exporting, comparative price analysis between Chile and other countries, existing international regulations, price analysis and its impact on selling price, relationship between packaging cost and selling price compared with the United States. Conclusions and recommendations are presented on this study and 10 months of subsequent field work. Attention should be directed toward improvements in packaging as a protection for foodstuffs, physical distribution, and marketing. It is stressed that the cost of packaging bears a significant relationship with selling price of foodstuffs. It is estimated that costs of physical distribution account for 6-12% of the selling price. In Chile, the per capita consumption of canned or bottled beverages and foodstuffs is US $8 per year, compared with US $46 in the United States. This indicates possible future growth and expanded economic activity for Chile in the food industry. (Portions of this document are not fully legible)

PB-287 062/4 PC A07/MF A01
Corporacion de Fomento de la Produccion (Chile).
Envases para Alimentos Industrializados Chilenos. Anexos (Packaging for Chilean Commerical Foodstuffs. Volume III. Appendices)
Jun 77, 149p
Text in Spanish. Prepared in cooperation with Javier Zaldivar Ingeneiros Asociados Limitada (Chile), Development Planning and Research Associates, Inc., Manhattan, KS., and Ingenieros y Economistas Consultores (Chile).

Keywords: Food packaging, *Chile, Marketing, Exports, Containers, Food industry, Packaging materials, Sanitary engineering, Design, Quality, *Packaging, *Food products, Developing country application.

The following topics are discussed: a marketing plan for foodstuffs destined for internal consumption or for export; description of surveys undertaken; packaging in metal, glass, plastic or paper containers and the use of each in the food industry; visits to plants manufacturing the different types of packaging and packing materials. Appendix VIII consists of a directory of 36 regional and national institutes of packaging and packing. Some of these are in London, Tokyo, Hong Kong, Taiwan, Bombay, Seoul, Bangkok, Brussels, Copenhagen, Helsinki, Paris, Berlin, Budapest, Dublin, The Hague, Oslo, Warsaw, and New York. Appendix IX lists books, journals, periodicals, and abstract bulletins concerned with food containers. These are English language references, printed in either the United States or in England. Visits to manufacturers included, among others, the American Can Company, Container Corporation of America, Gulf and Western Manufacturing Company, Anchor Hocking, and the Forest Products Laboratory. Research methodology describes the questionnaire design, analytical methods and the evaluation of international trends in the food industry. Factors evaluated are dents in metal containers; presence of foreign substances in cans, bottles, or containers; chemical composition of glass bottles; processing of milk products; consumer acceptance and complaints; as well as deterioration in flavor, taste, or color. (Portions of this document are not fully legible)

PB-287 063/2 PC A02/MF A01
Department of Agriculture, Washington, DC.
Productos Biologicos Veterinarios, Ayudan a Combatir Las Enfermedadea (Veterinary Biologics - Help Fight Animal Diseases)
Program aid rept.
1971, 12p Rept no. USDA/PA-815
Text in Spanish.

Keywords: *Drugs, Immunization, Livestock, *Animal diseases, Cattle, Poultry, Dogs, Cats, Rabbits, Swine, Vaccines, Toxins and antitoxins, Cholera, Tuberculosis, Rabies, Hepatitis, Developing country application, Immune serums, Erysipelas, Black murrain.

A study was undertaken of diseases (hog cholera, tuberculosis in cattle, rabies, black murrain, hepatitis and erysipelas) prevalent in farm animals (cattle, poultry, dogs, cats, rabbits, chinchillas, mink, pigs) and the use of vaccines, antiserums and antitoxins for control. Immunizations using both viral and bacterial vaccines; antitoxins to neutralize poisonous substances in the body; and antiserums to help defend against illnesses are all discussed with the emphasis on seeking knowledgeable help for administration of these drugs.

PB-287 064/0 PC A06/MF A01
Cordian Associates, Inc., New York.
La Industria Cementera (Industrial International Data Base the Cement Industry)
Sep 76, 123p NATO/CCMS-46
Text in Spanish. Sponsored by Energy Research and Development Administration, Washington, DC. Office of Conservation.

Keywords: International relations, Industries, Foreign countries, United States, *Cement, Cement industry, *Energy conservation, Energy efficiency, Developing country application.

This report addresses the need for a greater degree of international cooperation with respect to energy end-use conservation in particular industries. The purpose of this report is to cover the cement industry and to provide the details and the results of energy and technology comparisons for the various nations who participated in the study. Areas for possible improvement in energy efficiency are discussed, and a comparison is made of the energy content of various construction materials.

PB-287 128/3 PC A07/MF A01
Palmer (C. Mervin), Kennett Square, PA.
Algae and Water Pollution
Final Manual 1973-76
C. Mervin Palmer. Dec 77, 133p* EPA/600/9-77/036
Contract EPA-68-03-0232

Keywords: *Algae, *Water pollution, Identifying, Manuals, Lakes, Reservoirs, Fresh water, Estuaries, Odors, Taste, Sewage treatment, Ecology, Taxonomy, Pest control, Toxicity, Lagoons(Ponds), Oxidation, Plugging, Filters, Columbia River, Industrial waste treatment, Bioindicators, Eutrophication.

Algae are involved in water pollution in a number of important ways. It requires a continuous monitoring and study of algae existing in waters of various quality in order to determine what controls or what changes or what uses can be instituted for the benefit of man and for conservation of water and of desirable aquatic life. This manual presents a simplified identification key limited to algal species of importance in water supplies and associated with pollution. The most important species are illustrated in three-dimensional drawings in color. The manual also deals with the ecology and significance of algae and presents information on filter clogging and mat forming algae, attached forms, algicides and algal control, algae associated with pollution (both fresh water and estuarine), various uses of algae, algae of rivers and lakes, eutrophication, algae as indicators of pollution, methods of recording algae, and the use of algae in waste stabilization lagoons for the treatment of domestic and/or industrial wastes.

PB-287 132/5 PC A04/MF A01
Denver Research Inst., CO.
The College of Tropical Agriculture at the University of Hawaii: A Case Study in the U. S. Application of Science and Technology to Development in Developing Countries
Final rept. Sep 77-Feb 78
Theodore W. Schlie, Laurie N. Adler, and Melinda Cain. Jun 78, 68p
Contract NSF-C-SRS77-27991

Keywords: Developing countries, Technical assistance, *Agriculture, Tropical regions, Program planning, Universities, Utilization, Hawaii, *Education.

The purpose of this study is to illustrate and gain insight into the development and evolution of Less Developed Countries-oriented, scientific and technological activities at the College of Tropical Agriculture, University of Hawaii; to discuss their problems and future outlook; to attempt to learn from their experience in seeing how the United States can practically assist in applying science and technology to development in developing countries.

PB-287 251/3 PC A04/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Alimentos para la Paz en todo el Mundo (Food for Peace Around the World)
1963, 65p
Text in Spanish.

Keywords: Food dispensing, *Food services, Communities, Food preparation, Health, Nutrition, Projects, Manuals, Planning, Services, Kitchen equipment and supplies, Food sanitation, Local government, Schools, Developing countries, Food for Peace program, Developing country application, School lunch programs.

The publication suggests ways of setting up or improving simple and inexpensive feeding centers, ways of using local food, and ways of preparing and serving the food. The material will be helpful to all who are working to improve health and well-being through community feeding centers and school lunch programs.

PB-287 252/1 PC A03/MF A01
Singer Mfg. Co., Bridgeport, CT.
Make-a-Dress. Learn to Sew the Easy Way
Suzanne H. Firman. 1978, 43p

Keywords: Sewing, Instructional materials, *Clothing, Pattern making, Apparel fabrics, Crafts, Developing country application.

Sewing is a practical and creative art that can become a profitable hobby. This manual shows you how to make a foundation pattern and how to use this pattern to make two types of dresses. Once you have completed these you will be able to create a number of styles from this foundation pattern.

PB-287 253/9 PC A04/MF A01
Singer Mfg. Co., Bridgeport, CT.
Comment Faire Une Robe. (Make-a-Dress. Learn to Sew the Easy Way)
Suzanne H. Firman. 1978, 54p
Text in French.

Keywords: Sewing, *Clothing, Instructional materials, Pattern making, Apparel fabrics, Crafts, Developing country application.

Sewing is a practical and creative art that can become a profitable hobby. This manual shows you how to make a foundation pattern and how to use this pattern to make two types of dresses. Once you have completed these you will be able to create a number of styles from this foundation pattern.

PB-287 254/7 PC A03/MF A01
Washington County Closed Circuit Television Project, Hagerstown, MD.
Creating Visuals for TV
James Spear. c1962, 49p

Keywords: *Television, *Education, Visual aids, Training aids, Training films, Training devices, Instructions, Developing country application.

The guide should be useful for those who are concerned with discovering new ways of making their TV programming more exciting and challenging. It should be of particular help to those who are approaching the TV medium for the first time, either on commercial or educational channels, or on closed-circuit installations. Topics covered include studio props, special effects, projected resources, and nonprojected resources.

PB-287 255/4 PC A05/MF A01
Washington County Closed Circuit Television Project, Hagerstown, MD.
Les Auxiliaires Visuels dans la Television Scolaire (Creating Visuals for TV)
James Spear. 1962, 79p
Text in French.

Keywords: Television systems, *Education, Visual aids, Training aids, Training films, Training devices, Instructions, *Television, *Training, Developing country application.

This guide should be useful for those who are concerned with discovering new ways of making their TV programming more exciting and challenging. It should be of particular help to those who are approaching the TV medium for the first time, either on commercial or educational channels, or on closed-circuit installations. Topics covered include studio props, special effects, projected resources, and nonprojected resources.

PB-287 256/2 PC A02/MF A01
Agency for International Development, Tunis (Tunisia).
Some Aspects of an Open Drainage Canal and Maintenance Program
William J. Davis. 1978, 18

Keywords: Maintenance, Drainage, Irrigation canals, Cost effectiveness, Tractors, Cleaning, Failure, Prevention, Vegetation, Weed control, Shovels, Photographs, *Irrigation, Developing country application.

This booklet contains many aspects of a drainage program. Topics discussed include principal causes for the failure of open drainage canals, recent research on the mechanics of open drainage canal maintenance, and the Ahmed Davis shovel. Included in the booklet are several pages of photographs depicting various techniques.

PB-287 257/0 PC A02/MF A01
Agency for International Development, Tunis (Tunisia).
L'Entretient des Canaux de Drainage a Ciel Ouvert (Some Aspects of an Open Drainage Canal and Maintenance Program)
William J. Davis. 1978, 24p
Text in French.

Keywords: Maintenance, Drainage, Irrigation canals, Cost effectiveness, Tractors, Cleaning, Failure, Prevention, Vegetation, Weed control, Shovels, Photographs, *Irrigation, Developing county application.

This booklet contains many aspects of a drainage program. Topics discussed include principal causes for the failure of open drainage canals, recent research on the mechanics of open drainage canal maintenance, and the Ahmed Davis shovel. Included in the booklet are several pages of photographs depicting various techniques.

PB-287 258/8 PC A06/MF A01
Indiana Univ. at Bloomington.
L'Importance de la Formation dans les Services Public (Improving the Public Service Through Training)
Lynton K. Caldwell. Nov 62, 118p
Text in French.

Keywords: Specialized training, National government, Services, Resources, Learning, Education, Manpower utilization, Developing countries, Problem solving, Productivity, Students, Schools, Requirements, Government employees, Universities, Evaluation, *Training.

The purpose of this document is to interpret the function of training in present day government. It is addressed to a world-wide audience that includes public officials, political leaders, and civic-minded people everywhere who are concerned with improvement of the public service. It is intended to be useful to officials engaged in international technical assistance; to personnel, planning, and training officers; and to people interested in education for development administration. It does not describe training techniques but does set forth principles and concepts that are basic to enlargement of the human resources needed in national development.

PB-287 259/6 PC A07/MF A01
Indiana Univ. at Bloomington.
Improving the Public Service Through Training
Lynton K. Caldwell. Nov 62, 134p

Keywords: Specialized training, National government, Services, Resources, Learning, Education, Manpower utilization, Developing countries, Problem solving, Productivity, Students, Schools, Requirements, Government employees, Universities, Evaluation, *Training.

The purpose of this document is to interpret the function of training in present day government. It is addressed to a world-wide audience that includes public officials, political leaders, and civic-minded people everywhere who are concerned with improvement of the public service. It is intended to be useful to officials engaged in international technical assistance; to personnel, planning, and training officers; and to people interested in education for development administration. It does not describe training techniques but does set forth principles and concepts that are basic to enlargement of the human resources needed in national development.

PB-287 260/4 PC A07/MF A01
Bureau of Employment Security, Washington, DC.
Determination des Aptitudes et de la Formation Requises pour la Main-d'oeuvre (Techniques for Determining Manpower Skill Needs and Training Requirements)
Margaret Thal-Larsen. May 63, 130p
Text in French.

Keywords: Manpower utilization, Personnel development, Personnel management, Requirements, Specialized training, Career development, Education, *Management techniques, Developing country application.

This report is a handbook of simplified techniques for use in developing countries. The handbook includes methods for determining current skill needs and for introducing a continuing program of manpower reporting. The three areas discussed in this handbook are: manpower planning in economic planning; the area manpower skill survey; and occupational guides. Also included in the handbook is a section of worksheets to be used in the practical application of the techniques discussed.

PB-287 282/0 PC A12/MF A01
Bureau of Employment Security, Washington, DC.
Demographic Techniques for Manpower Planning in Developing Countries
1968, 262p

Keywords: Manpower, Requirements, Planning, Developing countries, Populations, Demographic surveys, Methodology, Population growth, Statistical analysis, Economic development, Interpolation, Extrapolation, Census, Population migrations, *Management techniques, Manpower development programs, Population dynamics, Labor force estimates, Age groups, Developing country application.

Important for the economic development process of any nation is an accurate assessment of its manpower. The handbook was prepared to meet the need for simplified techniques for estimating the labor forces and that part of the population which might be affected by manpower development programs. The areas discussed include: estimating and projecting total population, estimating and projecting components of population change, and the labor force. Included in the handbook is a section of worksheets for practical application of the areas discussed.

PB-287 264/6 PC A08/MF A01
Bureau of Employment Security, Washington, DC.
Tecnicas Demograficas Para El Planeamiento de la Mano de Obra de Paises en Desarrollo (Demographic Techniques for Manpower Planning in Developing Countries)
1968, 151p
Text in Spanish.

Keywords: Manpower, Requirements, Planning, Developing countries, Populations, Demographic surveys, Methodology, Population growth, Statistical analysis, Economic development, Interpolation, Extrapolation, Census, Population migrations, *Management techniques, Manpower development programs, Population dynamics, Labor force estimates, Age groups, Developing country application.

Important for the economic development process of any nation in an accurate assessment of its manpower. The handbook was prepared to meet the need for simplified techniques for estimating the labor forces and that part of the population which might be affected by manpower development programs. The areas discussed include: estimating and projecting total population, estimating and projecting components of population change, and the labor force. Included in the handbook is a section of worksheets for practical application of the areas discussed.

PB-287 349/5 PC A12/MF A01
Stanford Univ., CA. Inst. for Mathematical Studies in the Social Sciences.
The Radio Mathematics Project: Nicaragua 1974-1975
Barbara Searle, Jamesine Friend, and Patrick Suppes. c1976, 274p
Sponsored in part by Nicaraguan Ministry of Public Education, Managua.

Keywords: Instructional materials, Mathematics, Radio broadcasting, Students, Learning, *Nicaragua, *Education, Curricula, Developing country application.

This volume reports on the first experimental year of a research project designed to investigate, in a detailed and systematic way, the use of radio to teach mathematics in the primary-school classrooms of a developing country. Extensive collection of student response data, along with an explicit model for curriculum development, makes possible the type of study previously absent from the research literature. In July 1973 the United States Agency for International Development (AID) contracted with the Institute for Mathematical Studies in the Social Sciences (IMSSS) at Stanford University to carry out a two-stage project. During the first stage, which occupied the first funding year, members of the Institute staff visited several developing countries, whose governments had expressed an interest in teaching by radio, and selected from among them a suitable project site. The second stage of the project, undertaken in conjunction with the Ministry of Education of Nicaragua, is devoted to the development and evaluation of the radio instructional system. At present, the Radio Mathematics Project operates with financial support from both AID and the Government of Nicaragua.

PB-287 373/5 PC A09/MF A01
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture
Semi-Annual rept. no. 2, 1 Nov 77-1 Jun 78
C. R. Guerra, and B. L. Godfriaux. Jun 78, 181p
NSF/RA-780270
Grant NSF-ENV76-19854-A03

Keywords: Shrimps, Trout, Catfishes, Bass, Cooling water, *Aquaculture, Heat recovery, Thermal pollution, Electric power plants, Quality, Seafood, Marketing, Growth, Animal diseases, Mortality, Evaluation, Energy conservation, *Waste heat utilization, Salmo gairdneri, Ictalurus punctatus, Anguilla rostrata, Morone saxatilis, Macrobrachium rosenbergii.

The principal objective is to evaluate, at proof-of-concept scale, the potential of intensive aquaculture operations using power plant thermal discharges to enhance productivity. The field experiments involve the rearing of rainbow trout (Salmo gairdneri), channel catfish (Ictalurus punctatus) and American eel (Anguilla rostrata) for successive periods (semi-annual) in accordance with the temperature of the thermal effluents. Striped bass (Morone saxatilis) and the freshwater shrimp (Macrobrachium rosenbergii) are also being tested in smaller, laboratory size culture systems. The above mentioned species were selected because of their economic importance. They will be evaluated for food quality and marketability with the cooperation of potential commercial users. Aquaculture facilities were constructed at a steam electric generating plant for studies determining use for waste heat released into condenser cooling water. Growth rates, food conversion ratios, disease problems and mortality rates are being studied in the project. (Color illustrations reproduced in black and white) (Portions of this document are not fully legible)

PB-287 569-T PC A12/MF A01
National Marine Fisheries Service, Washington, DC.
Production of Meal, Oil and Protein-Vitamin Preparations in the Fishing Industry, Third Revised and Enlarged Edition
P. I. Kulikov. c1978, 260p Rept no. TT-74-52058

Keywords: *Fish protein concentrates, Oils, Proteins, Vitamins, Translations, Production, Food processing, Fishes, *USSR, Utilization, Automation, Crustacea, Mollusca, Mammals, Tables(Data), Whales, Epinephrine, Insulin, *Food products.

This book deals with problems connected with the production of fish meal, oil and protein-vitamin preparations in the fishing industry. The technological advances within and outside the USSR are reported; ways of improving the production processes of edible and industrial products and the best possible means of utilizing the raw material are outlined. The topics considered include automation and mechanization of the production processes, the economics of introducing new production technology for whole fish meal and fish flour, and the expansion of the production of medicinal, edible and industrial oils, vitamin-protein preparations, hydrolyzates and other valuable products from low-quality fish, crustaceans, mollusks and marine mammals. The book is intended for engineers and technicians in the fishing industry and university students of fishery science. (Copyright (c) 1978 Amerind Publishing Co. Pvt. Ltd., New Delhi.)

PB-287 593/8 PC A06/MF A01
Hawaii Natural Energy Inst., Honolulu.
Wind and Solar Energy Applications Study
George T. Koide, and Patrick K. Takahashi. Aug 77, 113p NSF/RA-770647
Grant NSF-AER76-05596
Sponsored in part by Hawaii State Dept. of Planning and Economic Development, Honolulu.

Keywords: Solar energy conversion, Wind power, Hawaii, Solar water heating, Solar space heating, Solar drying, Wind power generation, Pumping, Legal aspects, Environmental impacts, Economic impact, Utilization, Technology assessment, Reviewing, Planning, *Wind energy, *Solar energy.

The study on solar radiation and wind power applications is a facet of the total solar assessment program. Engineering consultants, government authorities, technology assessment specialists and businessmen were contacted for input into the report. The result is a broad implementation plan highlighting seven typical applications--three solar, three wind and one combination.

PB-287 852/8 PC A03/MF A01
North Carolina State Univ., Raleigh. Dept. of Food Science.
Minced Fish: Its Production and Use
Tyre C. Lanier, and Frank B. Thomas. Jun 78, 32p
UNC-SG-78-08, NOAA-78092704
Grant NOAA-04-6-158-44054

Keywords: Shellfish, *Fishes, *Food processing, Food preparation, Equipment, Quality control, Food industry, Food sanitation, Utilization, Sea Grant program, Minced fish.

The purpose of this publication is to introduce the packer or processor of fishery or meat products to the profit possibilities of minced fish and to answer many of the questions he may have regarding its production and processing into consumer foods. Each phase of minced fish processing, including selection and preparation of raw material, proper equipment, quality control, frozen storage and product applications, is covered in an introductory manner.

PB-287 940/1 PC A06/MF A01
Puerto Rico Univ., Mayaguez. Dept. of Marine Sciences.
Enhancement of Warmwater Fishcultures in Puerto Rico Through Use of Polyculture Systems Hybridization and of Local Foodstuffs in Formulation and Manufacture of Fish Feed Diets
Final rept. Jul 76-Jun 77
Ricardo C. Cortes Maldonado, and F. A. Pagan-Font. Sep 78, 115p NOAA-78092707

Keywords: *Aquaculture, Catfishes, *Puerto Rico, Fresh water fishes, Manuals, Ponds, Sites, Waste water reuse, Density(Mass/volume), Tropical regions, Economic analysis, Production, Diets, Feeding stuffs, *Fishes, Ictalurus punctatus.

The objective of this study was to test farm pond polyculture techniques using channel catfish (Ictalurus punctatus) and various combination of tilapis (Sarotherodon sp.) hybrids. Channel catfish cultured in combinations with various tilapia species and hybrids was more economically desirable than the monoculture of catfish. A manual to provide information to those interested in aquaculture was developed for distribution to the aquaculture industry.

PB-288 209/0 PC A03/MF A01
Economic Research Service, Washington, DC. Economic Development Div.
Strategies for Balanced Growth in Developing Countries
Final rept.
Clark Edwards. Jul 77, 35p Rept no. AER-375

Keywords: Economic Development, Developing countries, Growth, *Agricultural economics, Strategy, Technical assistance, Rural areas, Urban areas, Marketing, Farm crops, Productivity, Capital, Links(Mathematics), Government policies, *Industrial development, Economic growth, Economy, Technological advancement, Capital investments, Economic sectors, Program implementation.

Strategies for balancing growth among several economic sectors of a developing nation are outlined. The report focuses on programs to increase food production in the developing world and covers four separate sectors of a developing economy: traditional agriculture, advancing agriculture, the rural nonfarm economy, and the urban economy. The report notes that when new technology is introduced to any one sector, planners often overlook unintended side effects, some favorable and some not, on the other three sectors. Multifaceted programs designed to increase technology in rural and urban industries as well as in agriculture may help to alleviate some of the side effects.

PB-288 274/4 PC A12/MF A01
American Society of Civil Engineers, New York.
Appropriate Technology in Water Supply and Waste Disposal; a Workshop at the Annual Convention American Society of Civil Engineers Held at Chicago, Illinois on October 16-20, 1978
Oct 78, 260p Rept no. PREPRINT-3453

Keywords: *Water supply, *Sewage disposal, Water consumption, Municipalities, Water reclamation, Design criteria, Water distribution, Cost effectiveness, Lagoons(Ponds), Toilet facilities, History, Irrigation, Waste water, Systems analysis, Europe, Pumping, Epidemiology, Sanitation, Developing country application, Land application, Ocean waste disposal, Appropriate technology.

Contents:
- Historical thresholds in water supply and waste disposal;
- Behavioral factors in selection of technologies;
- Tradition and innovation in water use and reclamation;
- Simplified water treatment plant design;
- Intermediate service levels in water distribution;
- Intermediate service levels in sanitation systems;
- Environmental epidemiology and sanitation;
- Cost-effective use of municipal wastewater treatment ponds;
- Land treatment systems and the environment;
- Systems of waste water management in Europe;
- Measuring the effects of man's wastes on the ocean.

PB-288 384/1 PC A02/MF A01
Michigan State Univ., East Lansing.
Design and Management of Rural Ecosystems
Final rept. Jul 75-Jul 76.
1976, 15p NSF/RA-761630
Grant NSF-GI-20, NSF-ARA70-01077

Keywords: *Land use, Rural areas, *Agricultural economics, Ecology, Natural resources, Social effect, Management, Design, Irrigation, Decision making, Systems analysis, Mathematical models, Policies, Michigan.

The detailed results of the past two years of work on this project are presented in a series of 16 reports. This final report is a technical and detailed summary of the results given in reports 1 through 13, including a brief narrative discussion of the theoretical framework that provides a congruence to the particulars given in the reports. The principles of resource management suggest that decisions relating to comprehensive planning fall into three general categories: technical alternatives, ecological choices (natural environment), and institutional choices (social and cultural organization). Detailed studies of proto-typical subsystems relating to each class of decision were carried out as part of the overall effort. The results of these studies and their relationship to the overall conceptual framework are summarized in this report.

PB-288 847-T PC A18/MF A01
Soil Conservation Service, Washington, DC.
Soil Climate and Its Control
A. M. Shulgin. c1978, 411p Rept no. TT-72-51048
Contract NSF-C466

Keywords: Soil water, Soil science, Books, Temperature, Moisture content, Solar radiation, Heat transfer, Microclimatology, Periodic variations, Vegetation, Spring season, Winter, Plant growth, Wheat plants, Snow, Planting, Translations, *USSR, *Soils, *Agriculture.

The monograph is a summary of theoretical and applied researches on soil temperature and moisture as well as the methods of their control for agricultural utilization. The monograph contains a detailed discussion of methods and techniques of controlling the microclimate of soils in natural zones and the effect of application of agrotechniques influencing the microclimate in view of creating optimum thermal and moisture conditions in the soil and obtaining high yields. The method of observations and evaluation of efficiency in controlling soil climate conditions are also presented in the book.

PB-289 925/1 PC A09/MF A01
ACTION/Peace Corps, Washington, DC.
Intensive Vegetable Gardening for Profit and Self-Sufficiency
Program and training journal reprint series
Deborah Vickery, and James Vickery. Mar 78, 178p
Rept no. REPRINT SER-25

Keywords: Vegetable crops, Cultivation, Horticulture, Manuals, Income, Food supply, Plants(Botany), Soil fertility, Plant growth, Plant diseases, Irrigation, Pest control, Fertilizing, Tomato plants, Cabbage, Agricultural machinery, Planting, Mulches, Spraying, *Vegetables, Developing country application.

This manual provides the knowledge to help grow more food on less land which will increase incomes and provide a more abundant supply of food for the farmer, his country, and the world. The book is illustrated and discusses the importance of soil management, water usage, and fertilizers. A bibliography of other books relating to increased vegetable production has also been included.

PB-289 114/1 PC A04/MF A01
United Engineering Trustees, Inc., New York.
Methanol As an Alternate Fuel. Volume I. Conference Report of 1974 Engineering Foundation Conference Held at New England College, Henniker, New Hampshire on July 7-12, 1974
Summary rept.
Jul 74, 70p NSF/OEP-7423963/1/5
Grant NSF-OEP74-23963

Keywords: Methyl alcohol, Fuels, Meetings, Coal gasification, Crude oil, Natural gas, Cost analysis, Substitutes, Biomass, Fuel consumption, Utilization, National government, *Bioconversion, *Methanol, *Waste recycling, Solid wastes, Synthetic fuels, Manufactured gas.

Adequate technology exists to process gas, oil, and coal as feedstocks for methanol production; the technology to process solid wastes is still being developed. Methanol can be produced at prices competitive with current premium fuel price levels but, should foreign oil prices drop significantly, investment capital would be hard to attract. Priorities for developing conversion techniques should be (1) foreign flare gas; (2) municipal solid waste; (3) coal. Political and reliability considerations might rule out foreign sources. Uses of methanol fuel that become technically and economically ready in 5-10 years could absorb all methanol that might be available at competitive prices. Public policy could motivate government action to develop new fuel applications, such as automotive fuels. The government should share the risk of developing a methanol fuels industry; a number of alternatives to guarantee a market for methanol might be considered.

PB-289 115/8 PC A23/MF A01
United Engineering Trustees, Inc., New York.
Methanol As an Alternate Fuel. Volume II. Reprints of Papers of 1974 Engineering Foundation Conference Held at New England College, Henniker, New Hampshire on July 7-12, 1974
Jul 74, 546p NSF/OEP-7423963/2/5
Grant NSF-OEP74-23963

Keywords: Methyl alcohol, Fuels, Environmental surveys, Technology, National government, Biomass, Coal gasification, Cost analysis, Air pollution, Petrochemistry, Fuel cells, Sources, In situ combustion, Manufacturing, Physical properties, Chemical properties, Natural gas, Electric power plants, Synthesis(Chemistry), Proteins, Utilization, Chemical industry, Motor vehicles, Blends, Gasoline, Feasibility, Comparison, *Bioconversion, *Methanol, *Waste recycling, Solid wastes, Refuse derived fuels, Manufactured gas, Synthetic fuels, Low btu gas, Air quality.

The following papers were presented at the conference and are reprinted in this report. They include Physico-chemical properties of methanol related to fuel use, Methanol fuel from natural gas, Methyl fuel from remote gas sources, Technological aspects of producing methanol from coal, Methanol as a gas turbine fuel, Utility fuel system - low btu gas and methanol, Methanol-gasoline blends - a fuel supplier's viewpoint, Methanol-gasoline blends - university viewpoint, Feasibility study of alternative automotive fuels, Comparison of methanol and methanol-blends, Production of methanol from coal for the automotive market, Methanol - chemical uses today, Protein from methanol, Industrial wastewater: source or sink for methanol, Methyl alcohol production by in situ coal gasification, Methanol from forestry, municipal, and agricultural organic residues, Methanol from solid waste ... its local and national significance, Methanol as a fuel in the urban energy economy and possible sources of supply, Potential long-range improvements in methanol production, Methanol fuel for fuel cells, Methanol fuel - long-range implications for petrochemicals, Coal-derived methanol as motor fuel, Environmental aspects of methanol as vehicular fuel: health and environmental effects, and Environmental aspects of methanol as vehicular fuel: air quality effects.

PB-289 244/6 PC A03/MF A01
Illinois Valley Economic Development Corp., Carlinville.
Solar Space Heaters for Low-Income Families
Roger Fenton, and Patti Donahue. Sep 78, 29p
ILLDOE-78/09
Sponsored in part by Illinois Inst. of Natural Resources, Springfield. Div. of Alternative Energy.

Keywords: Solar heating, Space heaters, Manuals, Construction, Residential buildings, Windows, Design, *Solar heating systems, *Buildings, Solar space heating, Low costs, Solar collectors.

The publication is a manual designed to guide individuals in the construction and installation of a low-cost window-box solar collector. Included are explanations of solar collector fundamentals, lists of construction and installation materials and tools, step-by-step procedures for building and installing a unit and an extensive bibliography of information on home weatherization and solar energy use. (Portions of this document are not fully legible)

PB-289 251/1 PC A07/MF A01
Arizona Univ., Tucson. School of Renewable Natural Resources.
Forward Osmosis Extractors: Theory, Feasibility and Design Optimization
Doctoral thesis
Charles Donald Moody. 1977, 150p OWRT-B-053-ARIZ(4)
Contract DI-14-34-0001-7137

Keywords: Desalting, Membranes, Extractors, Theses, Solvents, Mathematical models, Potable water, Fortran, Computer programs, Fertilizers, Cast analysis, Polarization(Charge separation), Water treatment, Irrigation water, Water reclamation, Design criteria, Permeability, Feasibility, *Desalination, Reverse osmosis desalination.

Osmosis occurs when two solutions of differing osmotar concentrations are separated by a membrane permeable to the solvent but not to the solutes. In osmosis, water flows spontaneously from the low concentration source solution to the high concentration driving solution. Forward osmosis is examined as a low-technology, low-energy use process for hydration and dehydration of aqueous solutions. The fundamental mechanical device is a continuous counterflow extractor which incorporates a semipermeable membrane separating the source and driving solutions. The counterflow design permits maximum water recovery from the source solution and maximum dilution of the driving solution. The nonlinear differential equations describing the water and solute flows in the extractor are solved using analytical and numerical techniques. The resulting mathematical models contain design equations which can be used to determine the optimum membrane transport characteristics, optimum membrane size, and the asymmetric membrane orientation which minimizes concentration polarization. Theoretical and experimental results compare well. Two applications discussed in detail are the production of potable water from seawater using human nutrients, and fertilizer-driven forward osmosis (FDFO) for converting saline water to irrigation water.

PB-289 412/9 PC A06/MF A01
Informatics, Inc., Rockville, MD.
Vegetable Gums
Final monograph 1920-78
Robert Handler, and Walter Bauer. 30 Sep 78, 106p*
76-1926-015, FDA/BF-79/33
Contract FDA-223-76-2001

Keywords: Toxicology, Food additives, *Gums, Physical properties, Biochemistry, Laboratory animals, Ingestion(Biology), Parenteral infusions, Experimental data, Etiology, Bibliographies, Toxicity, Diets, Reviews, Safety, Bioassay, Tables(Data), Food industry, Occurrence, *Food fortification, Analytical methods, Toxic substances, GRAS food ingredients, Generally recognized as safe food ingredients, Arabinogalactan, Flaxseed gum, Furoran, Gum benzoin, Capaiba, Copals, Myrrh gum, Okra gum, Psyllium seed gum, Quince seed gum, Bassora, Damar gum, Cedar gum, Scleroglucan, Tamarind, Xantham gum, Oat gum, Tara gum.

The monograph summarizes the available scientific literature from 1920-1978 related to the safety of vegetable gums. Chemical information, biological data, and biochemical aspects of these compounds are contained in a 103 page summary containing 491 references.

PB-289 983/9 PC A05/MF A01
Inter-American Development Bank, Washington, DC.
Aspectos de la Produccion Agropecuaria de Centro-America en el Marco de la Integracion Economica (Aspects of Central American Farming Production within the Framework of Economic Integration)
1977, 91p
Text in Spanish.

Keywords: *Forestry, *Agricultural economics, Developing countries, Production, Farm crops, Cattle, International trade, International relations, Grain crops, Food, Costa Rica, El Salvador, Guatemala, Shortages, Prices, Investments, Honduras, Nicaragua, *Central America, Developing country application.

This publication is divided into three reports: (a) potential for specialization in the farming areas of Central American countries, (b) the farming subsector in Central America, and (c) regional cooperation for the development of Central American forest resources. Between 1974 and 1976, in cooperation with the respective governments, a tripartite study was made of the rural and farming sectors in Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The purpose of this publication is to delineate certain problems common to two or more of the countries which may, to a certain extent, be resolved through mutual cooperation. Increased productivity in cattle and crop raising, and hence in income, depends upon the degree of specialization of the five countries. In each country there are significant differences in soil, erosion, temperature, and precipitation. To offset such differences, efforts are being made to redistribute rural populations to less exploited areas. Trade restrictions on grain crops have hindered optimum utilization of resources and a local shortage of some foodstuff leads to price fluctuations that are undesirable. It is stated that investment and development programs can be aimed toward projects apt to promote competition leading to better organization of total resources.

PB-289 984/7 PC A05/MF A01
Inter-American Development Bank, Washington, DC. Div. of General Studies.
Informe General Sobre el Desarrollo Agropecuario y Rural de El Salvador (General Report on Rural and Farming Development of El Salvador)
Dec 76, 78p
Text in Spanish.

Keywords: *El Salvador, *Agricultural economics, Production, Farm crops, Cattle, Exports, Project planning, Rural areas, Grain crops, Food consumption, Developing country application.

During August and September 1974, a tripartite study was made for the purpose of assisting the government of El Salvador to study the strategy, policies, programs, and projects for increasing production in cattle and crop raising activities, and for raising the standard of living in rural areas. This report summarizes the background and rationale which gave rise to the principal suggestions and comments. Eight technical annexes, published in two separate volumes, provide a more detailed discussion of certain aspects of this general report. This report and its annexes are part of a series on the five Central American countries. The following main topics are outlined: national economy in relation to the cattle and crop raising sector; trends in the production of grain and cattle; socioeconomic factors affecting development; organization of agencies concerned with agriculture; soil resources in relation to production; incentives for agricultural development; and, strategy for rural and farming development.

PB-289 985/4 PC A06/MF A01
Centre National de Documentation Agricole, Tunis (Tunisia).
Index Retrospectif. Planification et Developpement Agricoles, Nos. 30001-30536, Volume 1 (Retrospective Index. Agricultural Planning and Development, Nos. 30001-30536, Volume 1)
1978, 117p
Text in French.

Keywords: *Agriculture, Planning, Development, Indexes(Documentation), Tunisia, Production, Cooperation, Bibliographies, Irrigation, Farm crops, Farm management, Developing country application.

As the first in a series of new publications, a retrospective index of bibliographic data is presented on agricultural planning and development. Rapid access to such information, by sectors, is needed by Tunisia in order to prevent useless duplication of research efforts. Documentation representing 40,000 reports, dating from 1947, was gathered by the National Center of Agricultural Documentation; it was then analyzed and microfiched. Information from these reports is disseminated through retrospective indexes. These data base of documents and microfiche can be accessed according to the need of users. For example, a user interested in ground water may formulate several questions which are then developed into a search strategy. The end product is a specialized bibliography corresponding to that query. Each bibliographic citation contains a brief analytical summary which is composed of descriptive key words. Some examples of key words are sociological survey, technical report, synthesis. The key words are arranged so as to form a type of annotation. The original language of the document is indicated. Documents selected by the user, according to bibliographic accession number, may be furnished either in microfiche or in hard copy reproduction. The retrospective index also provides subject matter and personal author indexes. An additional index provides a list of accession numbers for each corporate author.

PB-289 986/2 PC A07/MF A01
Ministerio de Planificacion y Politica Economica, Panama City (Panama). Dept. de Politica Cientifica y Tecnologica.
Diagnostico para el Desarrollo de Servicios de Informacion Cientifica y Tecnologica en Panama (Analysis of the Development of Scientific and Technological Services in Panama)
Final rept.
Stella G. Dextre. Dec 77, 149p
Text in Spanish.

Keywords: *Libraries, *Panama, Surveys, *Information services, Requirements, Librarians, Professional personnel, Objectives, Developing country application, Data banks.

An analysis is presented of all sectors concerned with scientific and technical information in Panama. Survey recommendations are provided for information services in Panama, which are neither organized nor centralized. Research methodology includes interviews and survey instruments for existing library resources in such fields as mining, health, telecommunications, education, farming, and housing. Recommendations to fill the needs assessment include bibliographic bulletins, interlibrary loan, query response from a pertinent clearinghouse, and training of subject-matter librarians. Microform-, audiovisual-, and reprographic equipment is to be provided. Holdings of specific libraries are listed. For example, the University of Panama holds Chemical Abstracts, Nuclear Science Abstracts, and Excerpta Medica. The second part of this library survey and analysis quantifies the resources needed to implement the foregoing recommendations. Specific goals are the establishment of an industrial information center, an extension service to provide technical information to outlying sectors, and of data banks such as that being developed for agriculture. Strategy to obtain these goals includes a central coordinating office; this office should then become a member of international documentation organizations. Each Ministry should catalog its own publications; this would provide a basis for exchange of technical information in Panama, as well as selective dissemination of information with clearinghouses abroad.

PB-289 987/0 PC A04/MF A01
Farmer Cooperative Service, Washington, DC.
Improving Management of Farmer Cooperatives
General rept. no. 120
Milton L. Manuel. Jun 64, 55p

Keywords: Management, Organizations, Rural areas, Commerce, Agricultural economics, Rural sociology, Records management, Accounting, Budgeting, Auditing, Cooperation, Financial management, Capital, Industrial relations, Public relations, *Agricultural cooperatives, Cooperatives, Economic cooperation, Cooperative production and marketing systems, Organizational development, Developing country application.

The publication shows how management principles apply to local cooperatives and how they can be used to manage cooperatives successfully. It is intended specifically for managers and directors of these associations. The report also considers tools and techniques that can help put management principles into practice and gives suggestions for performing different management functions. Included in the tools are records and accounts, budgeting to meet various management needs, and the external audit.

PB-289 988/8 PC A02/MF A01
Department of Agriculture, Washington, DC.
Control de Niguas (Controlling Chiggers)
1973, 16p Rept no. USDA/BULL-137
Text in Spanish.

Keywords: Mites, *Pest control, Insecticides, Life cycles, Pesticides, Chiggers, Developing country application, Trombicula.

Various aspects of the chigger including its life cycle, effect on humans and animals, and their control are discussed in depth. The areas/animals/humans most likely to be affected/infested with chiggers can be controlled with an insecticide spray (exact directions for application are given in bulletin) or an insect barrier made of ropes treated in insecticide. Man going into an area infested with chiggers can protect himself by applying insecticide to crucial areas of his clothing. If unable to take precautionary measures against attack, a bathing and medical program are discussed to help relieve discomfort.

PB-289 989/6 PC A04/MF A01
Instituto de Investigacion para la Accion en Vivienda, Lima (Peru).
Construyendo con Ladrillo (Building with Brick)
Sep 77, 65p
Text in Spanish.

Keywords: Brick construction, Manuals, Construction, *Houses, Construction materials, Mortars(Material), Admixtures, Tools, Walls, Doors, Windows, Protection, Earthquakes, Safety engineering, Electrical engineering, Installation, *Bricks, *Building materials, Developing country application.

The purpose of the manual is to present, in tutorial form, the concepts and procedures of engineering needed to construct a practical home at minimum costs and with maximum protection from the elements, including earthquakes. Covered in detail are: (1) Parts of the house and their purpose; (2) Basic materials needed for mortar and mixing formulas; (3) Tools; (4) Land preparation; (5) Floor and wall construction - which mortar and brick-laying techniques best; (6) Construction of an earthquake-proof wall with window/door reinforcements; (7) Safe construction of a home in proportion to size; (8) Electrical installation after completion of a brick structure; and (9) Repair of cracked wall.

PB-289 990/4 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Rural Youth Clubs Around the World
1967, 42p

Keywords: Youths, Rural areas, Project planning, Project management, Group dynamics, Quality of life, Organizing, Farm crops, *Training, *Education, *Agriculture, Developing country application.

Rural youth work has been accepted as a way to introduce new ideas into rural life and train leaders and citizens for the future. Rural youth work is educational and aims at the total development of young people to prepare them for their role as useful citizens. A successful program is valuable to the youth who participate, the families involved, the community, and their country. Rural youth work is an effective way to close the gap between what is known about agriculture and home economics and what is actually practiced. This handbook shows how to establish, operate, and evaluate a rural youth program. Projects and special activities for youth groups are also discussed.

PB-290 239/3 PC A06/MF A01
General Accounting Office, Washington, DC. International Div.
Population Growth Problem in Developing Countries: Coordinated Assistance Essential
Report to the Congress.
29 Dec 78, 112p* Rept no. ID-78-54

Keywords: Population growth, Developing countries, Federal assistance programs, Foreign aid, Financing, Coordination, Cooperation, Leadership, Birth control, Sterilization, Organizations, Auditing, Program coordination, *Population control, Financial assistance, Voluntary organizations, Overpopulation.

Rapid population growth in developing countries impedes efforts to improve the quality of life. Many governmental, international, and private and voluntary organizations provide population assistance to an ever-increasing number of countries. Cumulative assistance could now total about $2 billion; the United States alone provided about $1.2 billion in the 1965-78 period. Because of the complexity of the problem and the many organizations involved, systematic coordination of assistance is essential to ensure that programs are as efficient and effective as possible. GAO recommends that the Agency for International Development work with the other major contributors and the developing countries to improve coordination, to reach agreement on leadership, strategy, and program responsibility, and to make sure that all participants are adequately informed of each other's activities.

PB-290 348/2 PC A05/MF A01
Stanford Univ., CA. Inst. for Communication Research.
An Annotated Listing of Training Institutions Offering Communications Courses to Developing-Country Personnel
Jeanne Moulton, and Peter Spain. Jul 78, 83p
Contract AID/ta-C-1472

Keywords: Schools, Radio broadcasting, Directories, Mass media, *Education, Specialized training, Universities, United States, Foreign countries, Developing countries, Organizations, *Training, Curricula, Listings.

This document lists institutions in the U.S., Canada and Western Europe that either presently offer or have the potential to offer communication for development training. Emphasis was placed on training in broadcasting and in social science approaches to communication and development. Each institution is described briefly in terms of programs relevant to this survey, faculty and student activites, and interest expressed in further cooperation with USAID.

PB-290 397/9 PC A12/MF A01
Stanford Univ., CA. Inst. for Communication Research.
A Description of 15 U.S. Training Institutions Offering Communications Courses to Developing-Country Personnel (Based on Site Visits)
Jeanne Moulton, and Peter Spain. Jul 78, 268p
Contract AID/ta-C-1472

Keywords: Schools, Radio broadcasting, Mass media, *Education, Specialized training, Universities, United States, Foreign countries, Developing countries, *Training, Curricula, Training programs.

Based on site visits, the purpose of this inventory is to provide information to the Development Support Bureau of the U.S. Agency for International Development about development communication training programs within the U.S. for students from developing countries. These programs might offer either graduate training at the Master's Ph.D. level or short-term non-degree training. The survey is limited to communication training in the electronic media and instructional technology, excluding print journalism. It does include training for communication research and policy planning.

PB-290 419/1 PC A04/MF A01
Natural Energy Association, Kingston upon Thames (England).
Natural Energy and Living, Number 2, 1976
Bob Todd, Peter Mullet, George McRobie, and Paul McClory. c1978, 53p

Keywords: Wind power, Hydroponics, Solar heating, Buildings, Reviewing, Great Britain, *Wind energy, *Solar energy, *Energy source development, Developing country application, Fuel reprocessing plants.

This small booklet will be of interest to those who are involved in the uses of natural energy. The booklet is the second in a series of four issues on the innovative uses of natural energy. Featured in the booklet are articles on low energy use housing; the need for alternative energy technology; hydrophonics; solar heat; the Windscale Follies and the advisability of setting up nuclear fuel reprocessing plants in the north of England; and a home built using solar panels, a wind generator, diesel set, and a steam engine.

PB-290 420/9 PC A04/MF A01
Natural Energy Association, Kingston upon Thames (England).
Natural Energy and Living, Number 3, 1976
Robin Clark, Mike Cooley, Michael Hobbs, and Alan Jones. c1978, 60p

Keywords: Solar cells, Wood, Stoves, Land use, Solar heating, Wind power, Hot water heating, Great Britain, *Solar energy, *Wood stoves, *Wind energy, *Energy source development, Developing country application, Wood burning stoves.

This booklet discusses the latest developments in the field of natural energy. The emphasis is on a simple, efficient, and ecology-minded technology. There is a round-up of current events occurring in natural energy plus features on solar cells, wood burning stoves, the land bond plan, and a technology for workers. Anyone interested in natural energy may find this booklet informative.

PB-290 421/7 PC A10/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Postharvest Food Losses in Developing Countries
Final rept.
Dec 78, 217p Rept no. CIR/BOSTID-78/30
Contract AID/csd-2584

Keywords: Harvesting, Developing countries, Losses, Food, Farm crops, Estimates, *Food processing, Grains(Food), Leguminous plants, Fisheries, Food consumption, Preserving, Conservation, Education, Specialized training, Recommendations, *Food storage, *Agricultural economics, *Agricultural extension services, Developing country application.

The study is devoted to assessing both the potential of food loss reduction efforts and their limitations. It summarizes existing work and information about losses of the major food crops and fish; discusses some of the economic and social factors involved; identifies major areas of need; and suggests various policy and program options for developing countries and technical assistance agencies. The study confirms that there is no known simple, inexpensive technology that can, by itself, make a profound impact on postharvest losses. On the contrary, postharvest food conservation can be achieved only through a combination of location-specific organization, problem identification, training, information, and adapted technology. Good conservation practice must be applied on a sustained basis, with continual refinement in response to new information. Significant worldwide reductions in food losses will result as the aggregate of these sustained national efforts, which should be given all possible support by bilateral and international technical assistance agencies.

PB-290 422/5 PC A16/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Postharvest Food Losses in Developing Countries: A Bibliography
Final rept.
Dec 78, 371p Rept no. CIR/BOSTID-78/30A
Contract AID/csd-2584

Keywords: Harvesting, Developing countries, Losses, Bibliographies, Food, Farm crops, Estimates, *Food storage, Food packaging, *Food processing, Irradiation, Fumigation, Education, Specialized training, Insect control, Microorganisms, Rice, Wheat, Grains(Food), Fruits, Vegetables, Potatoes, Leguminous plants, Fisheries, *Agricultural economics, *Agricultural extension services, Developing country application.

The Bibliography is a companion volume to 'Postharvest Food Losses in Developing Countries'. The bibliography includes reported estimates of food losses; discussions of loss factors and vectors; papers describing methodologies for food loss assessment; specific food loss reduction procedures; aspects of training for loss reduction; other information sources; and references dealing with the economics of food conservation. The bibliography contains 2,100 entries focusing on the following commodities and food groups: grains (particularly maize, rice, and wheat); pulses and legumes; fruits and vegetables; roots and tubers; and fish. The bibliography contains a table of contents, author index, and country index. Many entries are annotated.

PB-290 423/3 PC A15/MF A01
Centro Nacional de Productividad, San Salvador (El Salvador).
Manual de Administracion para la Industria del Vestuario (Administrative Manual for the Clothing Industry)
1976, 342p
Text in Spanish.

Keywords: Management methods, Textile industry, Technical assistance, Production management, Sales management, Marketing, Financing, Accounting, Cost analysis, Time studies, *Clothing, Manufacturing, Graphic methods, Manuals, Seasonal variations, Salaries, *Management techniques, Business administration, Fashion industry, Organization size(Groups), Developing country application.

The manual was written to provide businessmen in the garment industry with methods and recommendations designed to improve their management techniques. These recommendations are derived from a study of

several representative garment factories and are intended to aid in technical assistance work in the clothing field. Depending on the size and type of business, alternate techniques are presented. Special attention is devoted to production, financing, sales and marketing methods. Specific duties and responsibilities are listed for proprietors, sales managers and salesmen in relation to showroom sales, direct sales, wholesalers, retailers, and distributorships. Details are provided to set up an accounting system covering profit and loss, cost analysis, credit and/or cash sales, monthly reconciliation of bank statements, and statement of net worth. Graphics explain planning and controlled production, sales campaigns for special holidays (Christmas) and seasonal events (return to school). Time and motion studies are provided for garment cutters and quality control of the same. An appendix is devoted to the calculation of the actual cost of labor by noting that salary includes vacation pay and social security payments.

PB-290 424/1 PC A03/MF A01
Instituto de Investigacion Tecnologica Industrial y de Normas Tecnicas, Lima (Peru).
La Investigacion Tecnologica Industrial en el Peru. Analisis y Comentarios (Industrial Technological Research in Peru. Analysis and Comments
Oct 75, 34p Rept no. POLITICA TECHNOLOGICA-4
Text in Spanish.

Keywords: Technology, Research, *Peru, Finance, Resource allocation, Product development, Marketing, *Technology transfer, Information services, Imports, Capital, Documentation, Problem solving, Government policies, *Research and Development, *Industrial development, Industrial technology, Developing country application, Gross national product.

Ten reports dealing with the solution of technological problems of Peruvian industry are presented. The importance of an industrial technology policy is stressed. Budgetary allocations should be made for this purpose; capital can be accumulated through developing and marketing new products and processes, thereby creating new markets. Technology transfer, technical information depositories, documentation clearinghouses and abstract journals are cited in relation to availability of information and the time lag between capture and dissemination of technical data. Services offered by the National University of Engineering (Peru) are outlined in reference to basic research. Graphics are presented on the present-day 'second' industrial revolution in relation to the gross national product. It is noted that industrial automation does not create unemployment but does provide a method to shorten the technology gap. Technological research can improve industrial processes by utilizing domestic materials instead of more costly imported materials.

PB-290 425/6 PC A07/MF A01
Instituto de Investigaciones Tecnologicas, Bogota (Colombia).
Memoria del Seminario sobre Desarrollo de Tecnologia Industrial (Report of the Seminar on Development of Industrial Technology)
Jorge Ramirez Ocampo, Jorge Mendez Munevar, Oswaldo Parra Morales, and Francisco Piedrahita E. Feb 75, 138p
Text in Spanish.

Keywords: Technology innovation, Industries, Colombia, Research management, Financing, Resource allocation, Exports, Marketing, Publicity, International relations, Government policies, Technical assistance, Socioeconomic status, Information services, *Industrial development, *Technology transfer, *Research and development, Industrial technology, Scientific enterprise, Developing country application.

A seminar was held on 12-13 February 1975, in Colombia, S.A., to discuss the development of industrial technology. The main objectives were to form an industrial science and technology policy, and to analyze problems related to this development in view of the country's need to raise its socio-economic level. Seminar topics included financing of technological development, the industrial technology system regarding promotion of exports, Colombia's position within the Andean Group, technology and the industrial sector, and the relationship of foreign businesses with Colombia's technological development. Conclusions and recommendations covered financing through budgetary allocation; strengthening local technological capability (e.g., constructing plants and providing consulting services); strengthening domestic demand for science and technology works (e.g., acquisition and analysis of technological information); directing such activities toward priorities of the country; and the formation of a national science and technology policy.

PB-290 426/6 PC A07/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Ciencia Tecnologia y Desarrollo, Volume 2, Numero 1, Enero-Marzo, 1978 (Technological Science and Development, Volume 2, Number 1, January-March 1978)
Fernando Chaparro O, Dario Mesa, and Luis J. Jaramillo S. 2 Apr 78, 143p
Text in Spanish.

Keywords: Technology, Economic development, Developing countries, Research management, Government policies, Regulations, Businesses, Universities, Political systems, Information services, *Technology transfer, Assessment, Japan, Colombia, Industrial development, *Research and development, Scientific enterprise, Information dissemination, Developing country application, Industrial technology.

The technical journal consists of an editorial and five articles. The editorial discusses the technological and scientific revolution of the present day and puts into sharp focus the economic differences between the developed and the developing countries. The first article cites three types of institutions involved in a national policy on science and technology: those setting policy and furthering scientific works, those regulating the import of technology, and those directly involved in science and technology activities. The second article discusses the good relations involving science, technology and the university in terms of politics, economics, and governmental authority. Based on conferences, interviews and observation, the third article discusses technology dissemination in Japan and its pertinence to Colombia. The fourth article deals with technology assessment related to Latin America. Methodology and alternative technology are briefly discussed. Ten years of work of the committee on technology transfer is briefly covered in the fifth article.

PB-290 427/4 PC A09/MF A01
Subgerencia de Asuntos Cientificos y Tecnologicos, Bogota, Columbia. Div. de Desarrollo Tecnologico y Prospectiva.
Cartilla Sobre Adquisicion de Tecnologica (Note on the Acquisition of Technology)
Felix Moreno Posada. 30 Sep 77, 200p
Text in Spanish.

Keywords: *Technology transfer, Industries, Colombia, Information services, Acquisition, Technical assistance, Purchasing, Contracts, Patents, Commercial law, International trade, *Industrial development, Industrial technology, *Information sources, Developing country application.

Technology transfer is discussed in terms of information brokers, commercial transfer from developed to developing countries, information acquisition, and patents. Concepts also mentioned are technological gap, know-how, free exchange of information, trademarks, and national science policy. To guide the Colombian entrepreneur in acquiring technical information, some recommendations are provided on how to negotiate a contract. Alternatives to purchasing are listed: copying it, developing it himself, contracting with a research organization, obtaining it through purchasing the hardware and software, and joining foreign investors who already have it. Chapter IV details all possible clauses envisioned in a contract to purchase technical information and equipment. Chapter VII outlines stipulations on guarantees, privileged information, transfer to third parties, most-favored-nation clauses, and applicable legislation. In addition, a check list is provided for the businessman before signing the contract. A 24-item bibliography is included.

PB-290 509/9 PC A24/MF A01
International Road Federation, Washington, DC.
World Survey of Current Research and Development on Roads and Road Transport (1976). A Report Covering an Inventory of 59 Countries
Annual rept. for 1976.
Dec 78, 574p* FHWA/RD-79/38
Contract DOT-FH-11-8893
Prepared in cooperation with Organization for Economic Co-Operation and Development, Paris (France). and Transportation Research Board, Washington, DC.

Keywords: *Roads, Highway transportation, Research projects, Foreign countries, Transportation management, Highway planning, Construction, *Pavements, Materials, Maintenance, Urban transportation, *Traffic engineering, Traffic safety, Land use, *Road transportation, Road materials, Foundation engineering, Roadside development, Transportation corridors, Transportation planning.

This is the 13th in a series of annual reports on inventories of research and development projects conducted by governmental, academic and commercial research organizations in 59 countries, as reported by surveyors of the International Road Federation, the International Road Research Documentation program of the OECD, and the HRIS. It is the only publication that reports world-wide information on current research activities in the highway field. The report lists 5,609 projects, classified in accordance with the subject area classification system of the Transportation Research Board.

PB-290 654/3 PC A07/MF A01
Alabama Dept. of Conservation and Natural Resources, Gulf Shores. Claude Peteet Mariculture Center.
Experimental Pond Production of Selected Marine Species
Completion rept. Jul 75-Sep 78
William C. Trimble, and Walter M. Tatum. Nov 78, 136p NOAA-78122001

Keywords: *Ponds, *Aquaculture, Brackish water, Marine fishes, Trout, Shellfish, Shrimps, Minnows, Feeding stuffs, Growth, Temperature, Photoperiodism, Circulation, Survival, Alabama, Bait fish.

During 1975-1978, ten marine species were evaluated as mariculture candidates at Alabama's Claude Peteet Mariculture Center at Gulf Shores, Alabama. The site, to investigate brackish water food production, as well as bait production, was selected on traditionally agricultural land adjacent to the Gulf Intracoastal Waterway. Earthen ponds were selected as initial experimental units for production and were filled with brackish water from the Waterway. Candidates selected for culture for research conducted during 1975-1978 included: Florida pompana (Trachinotus carolinus), penaeid shrimp (Penaeus aztecus, P. duorarum, P. setiferus, and P. vannamei), gulf killifish or 'bull minnow' (Fundulus grandis), rainbow trout (Salmo gairdneri), red drum or 'redfish' (Sciaenops ocellata), red snapper (Lutjanus compechanus), and river shrimp (Macrobrachium ohione).

PB-290 760/8 PC A12/MF A01
Lockheed-California Co., Burbank.
Conversion and Storage of Wind Energy as Nitrogenous Fertilizer
Final rept.
Michael B. Dubey. Nov 78, 264p Rept no. LR-28338
Contract NSF-C-75-22186

Keywords: Ammonia, Ammonium nitrate, Wind power generation, Hydrogen production, Electrolysis, Fertilizers, Environmental surveys, Design criteria, Energy storage, Manufacturing, Process charting, Technology, Chemical industry, Storage, Performance evaluation, Capitalized costs, Economics, Comparison, *Fertilizers, *Wind energy, Chemical feedstocks, State of the art.

Wind energy, air and water can be combined to make anhydrous ammonia and ammonium nitrate, two important nitrogeneous fertilizers that are usually synthesized using natural gas as the primary feedstock. In the study concept, wind energy is captured by a wind turbine and converted to electricity. The electricity generates hydrogen and oxygen by water electrolysis. The hydrogen is stored in sufficient quantity to serve as chemical feedstock and energy to manufacture anhydrous ammonia or ammonium nitrate solution.

PB-291 460/4 PC A06/MF A01
Montana Dept. of State Lands, Helena.
Economic Analysis of Cropping Systems in Dryland Farming
Final rept. Dec 74-Dec 76

Oscar R. Burt, and M. S. Stauber. Apr 77, 124p
OWRC-042
Contract OWRC-10570032
Prepared in cooperation with Montana State Univ., Bozeman. Dept. of Agricultural Economics.

Keywords: Grain crops, *Agricultural economics, *Arid land, Salinity, Production, Yield, Optimization, Wheat plants, Barley plants, Soil water, Losses, Fertilizers, Mathematical models, Markov chains, Profits, Montana, North Dakota, South Dakota, Wyoming, *Farming, Crop rotation.

Results of this research provide the basis for determination of economically optimal crop rotation strategies for the Northern Great Plains that will more fully utilize moisture and aid in eliminating saline seeps. The crop yield response relationships estimated in the analysis will be useful for a better understanding of cereal crop yields in relation to climatic variables.

PB-291 515/5 PC A04/MF A01
Stanford Univ., CA. Communications Satellite Planning Center.
Manpower Forecasting Model for Educational Planning
Technical rept.
James Boettcher, and Lawrence T. Brekka. Dec 76, 73p Rept no. TR-13
Contract NIRT-1

Keywords: *Education, Models, Manpower, Forecasting, Radio broadcasting, Television systems, Specialized training, Requirements, Farms, Mass media, Instructional materials, *Iran, Developing countries, *Management techniques, Teaching methods.

The National Cropping Plan of Iran is reviewed to define the critical improvements in farming techniques required to meet food production needs. Changes that depend on the education of Iran's small farmers are isolated and organized into a series of informational programs for television or radio. Iranian and International Agricultural experts outline over 150 program segments covering the critical practices. The program segments are organized into eight broadcast area schedules to suit the agro-climatic conditions and crop selections in different parts of the country. The procedures to organize the program information and broadcast schedules and much of the subject content itself is felt to be applicable to other developing agricultural countries.

PB-291 554/4 PC A02/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Interdisciplinary Working Party.
CMU/Intertect Ultra Low Cost Shelters in Relief Situations in Bangladesh
Charles H. Goodspeed, Volker H. Hartkopf, and Frederick C. Cuny. May 77, 18p
Contract AID/TA-C-1174, AID/TA-C-1345
Prepared in cooperation with Intertect, Dallas, TX.

Keywords: Shelters, Developing countries, *Bangladesh, Housing planning, Construction, Citizen participation, Guidelines, Technical assistance, Technology innovation, *Housing, Emergency planning, Developing country application.

This is a report to the Agency for International Development on the two-year evaluation of the CMU/Intertect refugee shelter field test in Bangladesh. The test shelters were built during Spring, 1975, and revisited during Spring, 1977.

PB-291 588/2 PC A02/MF A01
Collier's Earthworm Compost System, Inc., Santa Clara, CA.
Conversion of Municipal Wastewater Treatment Plant Residual Sludges into Earthworm Castings for Use as Topsoil
Annual rept. no. 1, 15 Jul 77-14 Jul 78
Jack E. Collier. 14 Jul 78, 21p NSF/RA-780346
Grant NSF-ENV77-16832

Keywords: Worms, Composts, Sludge digestion, Soil stabilization, *Sewage treatment, Vegetable crops, Sludge disposal, Invertebrates, Plant growth, Breeding, Feasibility, Soil analysis, Metals, Field tests, Harvesting, Cost analysis, Soil fertility, Demand(Economics), Evaluation, *Soils, Vermicomposting, Earthworms, Heavy metals.

This experiment demonstrates the physical abilities of earthworms to convert sizable amounts of municipal sewage sludges into worm manure, a stabilized soil known as castings. The process of composting wastes with domesticated earthworms under controlled conditions, called vermicomposting, is believed by the investigator to be an efficient and economical method of recycling sludges and other organic wastes. The report describes the conditions of the experiment and a summary of findings. These include longevity tests of redworms in sludge, pathogen tests, handling and harvesting techniques, plant growth comparisons, breeding rates in sludge, optimum worm density, product demand, heavy metals analysis, and soil temperatures. In a review of principal findings it is indicated that vermicomposting offers a much higher degree of stabilization over other conventional thermal composting methods. The report also lists publications, conferences, and new objectives.

PB-291 846/4 PC A05/MF A01
ACTION/Peace Corps, Washington, DC.
Programming and Training for Small Farm Grain Storage
Program and training journal manual series
Carl J. Lindblad. Sep 78, 100p Rept nos. ACTION/PAM-4200.27, MANUAL SER-2B

Keywords: Storage, *Grains(Food), Specialized training, Farms, Manuals, Moisture content, Pest control, Insects, Rodents, Drying, Losses, Heat, Fungi, Birds, *Food storage, Developing country application.

Although grain storage program conception and objectives will vary from country to country and within each country, there are basic objectives which will be present in every grain storage program. These include: (1) to preserve the quantity of the harvest, (2) to maintain its quality, and (3) to result in the highest possible sale value for whatever grain is sold or traded. This book is designed to aid in identifying storage problems and devising solutions to them. The approach favors techniques based on the local needs and resources of the farmer. Basic subject areas discussed are the maintenance of storage hygiene; the control of grain moisture; and the specific control of grain pests such as insects, birds, and rodents.

PB-291 847/2 PC A10/MF A01
ACTION/Peace Corps, Washington, DC.
Freshwater Fish Pond Culture and Management
Program and training journal manual series
Marilyn Chakroff. cApr 78, 208p Rept no. MANUAL SER-1B
Prepared in cooperation with Volunteers in Technical Assistance, Inc., Mt. Rainier, MD.

Keywords: *Ponds, Fresh water fishes, Aquaculture, Instructional materials, Manuals, Site surveys, Construction, Planning, Soil properties, Clay soils, Sealing, Fluid filters, Management, Selection, Animal diseases, Fertilizers, Oxygen, Dissolved gases, Drainage, *Fishes, Developing country application.

Growing fish in ponds is a very old practice. This method of farming can accomplish the dual purposes of providing a reliable food supply and of making the best possible use of the land. This book is a how-to manual designed to aid in the establishment and maintenance of local fish pond operations. The book is illustrated and includes a listing of resources to give further direction to those wishing more information on various aspects of fish pond operation.

PB-291 857/1 PC A11/MF A01
ACTION/Peace Corps, Washington, DC.
Self-Help Construction of 1-Story Buildings
Program and training journal manual series
Peter Gallant, Nancy Bergau, Peter Hunt, and Jim Seaton. 1977, 244p* Rept no. MANUAL SER-6

Keywords: Residential buildings, Housing planning, Developing countries, Design, Quality of life, Project planning, Construction management, Construction materials, Toilet facilities, Foundations, *Housing, Developing country application.

This manual is designed to assist a community or a family to: (1) plan and design a one-story building for present and future needs, (2) assess the advantages and disadvantages of locally available construction materials, (3) draw and understand their own construction plans; and (4) successfully complete construction according to their own plans. The focus is on basic principles of construction with materials that are low-cost, available in many parts of the world, and easy to work with. It is illustrated to help make the processes easier to visualize. These buildings are specifically designed for developing countries and do not necessarily meet building code requirements.

PB-291 858/9 PC A20/MF A01
Environmental Protection Agency, Cincinnati, OH. Office of Technology Transfer.
Manual de Metodos para el Analisis Quimico de Aguas y Desechos (Manual of Methods for Chemical Analysis of Water and Wastes)
Jul 76, 459p
Text in Spanish.

Keywords: Manuals, Water analysis, Chemical analysis, Surface waters, *Waste water, Industrial wastes, Water pollution, Arsenic, Boron, Bromides, Chlorides, Colors, Organic compounds, Inorganic compounds, Monitoring, pH, Cyanides, Dissolved gases, Fluorides, Iodides, Metals, Trace elements, Oils, Nitrogen, Phosphorus, *Water quality, Water pollution detection, Procedures, Biochemical oxygen demand, Chemical oxygen demand, Developing country application.

This second edition of this manual contains the chemical analytical procedures used in U.S. Environmental Protection Agency Laboratories for the examination of ground and surface waters, domestic and industrial waste effluents, and treatment process samples. The manual provides test procedures for the measurement of physical, inorganic, and selected organic constituents and parameters.

PB-291 939/7 PC A04/MF A01
ECOS, Inc., Boston, MA.
Community Water Management, Research Needs for Small and Urbanizing Communities
David A. Del Porto. Jul 78, 70p NSF/RA-780372

Keywords: *Water supply, Water quality management, Urban areas, Sewage treatment, Prices, Water conservation, Conflicts, Waste water reuse, Aquaculture, Water consumption, Toilet facilities, Water treatment, Ground water, *Water quality, Water demand, Water costs.

Various methods of approach in dealing with the water needs of small and urbanizing communities are outlined. One section is devoted to water quality issues, such as types of contamination and sources of pollution. Another, entitled Supply, Demand, and Use concerns historical perspectives of wastewater management, the re-definition and semantics of supply and demand, the conflict of environment vs. energy, and economic considerations. Other sections analyze future trends and viable alternatives to the flush toilet such as compost systems. Wastewater aquaculture and community planning are considered as alternative futures.

PB-292 393/6 PC A07/MF A01
Environmental Protection Agency, Washington, DC. Facility Requirements Div.
Municipal Wastewater Management. Public Activities Guide
Technical rept.
Clem L. Rastatter, John Hammond, and Larry McBennett. Feb 79, 126p* Rept nos. EPA/430/9-79/005, FRD-7

Keywords: Citizen participation, Water pollution control, Public utilities, Facilities, Planning, Decision making, Communities, Government policies, National government, *Waste water, Handbooks, Guidelines, *Sewage treatment.

This Handbook was prepared for use in a training program to acquaint citizen leaders with the important decisions that are made in planning for the management of municipal wastewater. The training program was designed to: (1) Identify the key decisions throughout the planning process that are critical to the outcome of that process and to the community's future; (2) Identify and analyze the environmental, economic, and social considerations that affect these important decisions; (3) Facilitate citizen input to those decisions by stripping the process of technical jargon, and helping the reader understand the community judgments that must be made; and, (4) Help citizens understand the legal

tools and participatory techniques that will facilitate their involvement in the planning process.

PB-292 394/4 PC A12/MF A01
Environmental Protection Agency, Washington, DC. Facility Requirements Div.
Municipal Wastewater Management. Citizen's Guide to Facility Planning
Technical rept.
Clem L. Rastatter, John Hammond, and Larry McBennett. Jan 79, 259p* Rept nos. EPA/430/9-79/006, FRD-6

Keywords: Citizen participation, Water pollution control, Public utilities, Facilities, Planning, Decision making, Communities, Government policies, National government, State government, Local government, Regulations, Legislation, Waste water, Handbooks, Guidelines, *Waste water, *Sewage treatment, Clean Water Act.

This Handbook is organized around a logical progression of questions that the involved citizen or local governmental official is likely to encounter in trying to influence the municipal sewage facilities planning process. The Handbook reflects the latest federal regulations and policies, as of January 1979, and assumes a level of interest that is more than casual on the part of the reader.

PB-292 588/5 PC A04/MF A01
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.
Communication Media and Technology: A Look at Their Role in Non-Formal Education Programs
Information bulletin
Henry T. Ingle. Aug 74, 69p Rept no. IB-5

Keywords: Specialized training, Mass media, *Education, Personnel development, Radio communication, Television broadcasting, Mass communication, Quality of life, *Television, Developing country applications, Educational games.

The purpose of this publication is to review the role communication media and technology have played in the area of non-formal education. Specific instances are cited in which media and technology are being used in non-formal educational projects around the world, along with background information on each of these efforts with particular emphasis being given to projects in the developing regions of the world. Discussed is the need for a non-formal approach to education as well as the implications of such an approach. Included is a review of the different types of media and technology which have been used or are currently being used in non-formal programs.

PB-292 587/3 PC A04/MF A01
Natural Energy Centre, Kingston upon Thames (England).
How to Use Natural Energy
Paul McClory, J. C. McVeigh, W. G. Jack, Kuno Tichatschek, and Anthony Wigens. c1978, 61p*
Also pub. as ISSN-0-9506107-1-2.

Keywords: *Solar energy, Wind power, *Hydroelectric power, Heat pumps, Heat recovery, Thermal insulation, Methane, Biomass, Swimming pools, Space heating, Electric power generation, Reviews, Great Britain, *Wind energy, Renewable energy sources, Energy conservation, *Bioconversion, Heat pipes, *Waste heat utilization.

This booklet is for those who wish to take an active part in the natural energy field or to be regularly informed of the latest developments on all aspects of energy conservation, self-sufficiency, and the environment. The objective is to promote a wide range of products which use natural energy as a primary source of fuel and to help conserve reserves of fossil fuels. The emphasis is to combine optimum combinations of quality and cost-effectiveness. Some of the topics discussed in this booklet include: solar heating; power from the wind; water power; heat pumps; waste heat recovery; heat wheels; and home insulation.

PB-292 590/7 PC A05/MF A01
Maine Univ. at Orono. Cooperative Extension Service.
Taking Care of Wooden Ships
Maynard Bray. Jan 78, 85p* NOAA-79010502
Grant NOAA-04-8-MO1-79

Keywords: *Ships, Maintenance, Wood, *Wood preservatives, Coating processes, Caulking, Guidelines, *Boats, Constitution vessel, Clearwater vessel, Sea Grant program.

Two papers and discussions are presented on the care of old and relatively new wooden ships. The first was taken with some editing from the proceedings of the Bath Marine Museum's Symposium on American Maritime History, held on May 6-8, 1977, and mainly concerns the maintenance of the U.S.S. Constitution. The second paper is a manual for the maintenance of the Hudson River Sloop Clearwater prepared in 1976 by Maynard Bray. Special care of wooden ships is a skill now limited to a few and efforts are being made to perpetuate these skills.

PB-292 594/9 PC A02
Florida Dept. of Natural Resources, St. Petersburg. Marine Research Lab.
Effects of Stocking Size and Density on Growth and Survival of 'Macrobrachium rosenbergii' (De Man) in Ponds
Scott A. Willis, and Mark E. Berrigan. 1978, 15p
CONTRIB-289, NOAA-76122801

Keywords: Aquaculture, Shellfish, Growth, Survival, Density(Mass/volume), *Ponds, Weight(Mass), Mortality, Florida, *Fishes, Macrobrachium rosenbergii.

Postlarval and juvenile Macrobrachium rosenbergii were stocked in twelve 0.025 ha earthen ponds to study the effects of stocking size and density on growth and survival. The experiment was comprised of four treatments, three replicates each. One treatment consisted of juveniles (0.760-0.792 g) stocked at 5/sq m. The remaining treatments were postlarvae (0.044-0.063 g) stocked at 5, 10, and 20/sq m. Following each four week sampling interval, feeding rates were adjusted based on mean body weight and an estimated 5% mortality. All ponds were fed Purina Marine Ration 25 at rates of 30, 15, 8, 4, 2, and 2% body weight for each respective sampling interval during the 24 week study. Juveniles grew to a mean weight of 43.256 g while postlarvae reached 29.749 respectively. Survival ranged from 38 to 92% and final feed conversion ratios ranged from 1.88:1 to 0.96:1. The maximum equivalent production of 2278.61 kg/ha occurred in ponds stocked with 20/sq m.

PB-292 664/0 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to Set Up and Operate a Small Community Electric System
May 59, 32p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: Electric power plants, Requirements, Electric generators, *Electric power, Electric power distribution, Revenue, Electric utilities, Investments, Profits, *Industrial plants, Developing country application, Villages.

The purpose of the manual is to provide information for establishing electric systems in small villages where such services are not now available. Small electric generators are available that can be used in building systems that will meet the needs of small villages. These systems would be based on the number of homes and stores to be lighted, the number of street lights required, the power requirements of local industries and the estimated expansion requirements. These small electric systems will provide a valuable service to such villages by producing and distributing power at a cost that the average community can afford. Under reasonable conditions, such as those assumed for the plant in this manual, either public operation or private operation would be practicable. Such an electric plant will produce revenue to amortize the investment and at the same time provide an operating profit of more than 15 percent. For the entrepreneur there is an opportunity to invest money, on which he will earn a satisfactory return, have employment at a fair salary, and at the same time be increasing the value of his property. This revised version of the manual includes current costs of labor, machinery, equipment and supplies, as well as additional information relative to engineering, training, safety, markets, sales, financial and economic factors. The manual is designed to provide a general picture of the factors which must be considered in establishing and operating a small-scale plant of this type. It should prove useful in creating interest in the subject, and serve to give enough understanding of the related considerations to help government officials, other leaders and businessmen to determine whether the potential deserves more-detailed attention.

PB-292 665/7 PC A02/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Surgical Instruments
Sep 61, 13p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Surgical instruments, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Industrial management, Production planning, Cost estimates, Developing country application.

The document gives information on the production and plant requirements for the manufacture of surgical instruments including plant layout. Assumption of production at a minimum volume level is made. Most basic instruments have been carefully selected and a list is given. The report is one of a series of reports resulting from overseas technical inquiries on factory, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 666/5 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Salicylic Acid
Sep 61, 33p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Chemical industry, *Industrial plants, Manufacturing, *Salicylic acids, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing and operating a chemical plant in a foreign country for the production of salicylic acid. In the United States salicylic acid is manufactured in three quality grades: technical, crystalized and sublimed (USP). All three of these grades can be manufactured in this plant. Since the technical grade acid has the largest use, all facts and figures shown in this report will be based on the production of technical grade acid. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 671/5 PC A03/MF A01
United States Testing Co., Inc., Hoboken, NJ.
Plant Requirements for Processing Potato Chips
Apr 62, 43p

Keywords: *Industrial plants, Food processing, Manufacturing, Requirements, Potatoes, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sanitation, Safety engineering, *Food products, *Vegetables, Developing country application, Potato chips.

The purpose of the report is to present basic information for establishing and operating a manufacturing plant in a foreign country to produce potato chips. In the United States, the plant outlined in this report is considered small to medium-sized. Other typical United States plants are more mechanized and have higher production rates. A plant of this kind, if built in a foreign country, could use less equipment and require more labor but a smaller capital investment. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 672/3 PC A02/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements for Manufacture of Potash
Jun 62, 11p

Keywords: *Chemical industry, *Industrial plants, Manufacturing, *Potassium carbonates, Requirements, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Production planning, Cost estimates, Labor estimates, Fertilizers, Developing country application.

The major use of potassium salts is for fertilizer, since potassium, along with nitrogen and phosphorus, is one of the three essential minerals for plant food that are rapidly depleted from soils whose crops are harvested annually. Ninety per cent of all the potassium salts mined in the United States go into fertilizer. The refinery described in the report is typical of refining techniques in New Mexico; the description is based on a capacity of 30 tons per day of 50% K2O and 120 tons per day of 60% K2O fertilizer. It is assumed that a sylvite or sylvinite ore of approximately 20-25% K2O content is available at the required 645 tons per day amount. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 675/6 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Crochet and Knitting Yarns
1961, 34p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Yarns, Carded yarns, Combed yarns, Cotton spun yarns, Requirements, Production management, Production methods, Production capacity, Operating costs, Cotton fibers, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Spinning(Staple fibers), Textile processes, Carding, Combing, Rovings, Winding, Reeling, *Clothing, Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce crochet and knitting yarns. The report was pepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 676/4 PC A02/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements for Manufacture of Tungsten Carbides
Nov 55, 16p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Tungsten carbides, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sintering, Metal shapes, Developing country application.

In its broad outline, the process on making tungsten carbide cutting tools, wire drawing dies, header dies, gages and other industrial products consists of preparing the powder carbide of tungsten, mixing it with a binder (such as cobalt) into compacts of desired forms, and sintering these to get the desired shapes, hardness, strength and other attributes. Though this pattern appears simple, it soon becomes evident from a detailed study that the techniques involved are different from those generally used in powder metallurgy. A survey was made among the manufacturers of the necessary equipment, and technicians experienced in carbide making, and the steps established as the pattern peculiar to this industry are explained in the report. The report is one of a series of reports resulting from overseas technical inquiries on factory establishments, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 688/9 PC A04/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Rubber Fabric Canvas Shoes
May 59, 55p

Keywords: *Industrial plants, Manufacturing, Shoes, Requirements, Elastomers, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Sewing, Woven fabrics, Fabrics, *Footwear, Developing country application, Sneakers, Tennis shoes.

There are many different designs of rubber sole fabric shoes produced in the United States. The shoe made in the plant described in the report is a simple circular vamp oxford with a rubber sole. This shoe is commonly referred to as a tennis shoe or 'sneaker' in the United States and this type of rubber sole shoe is widely used in foreign countries. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 689/7 PC A02/MF A01
Department of Commerce, Washington, DC.
Plant Requirements for Manufacture of Unfermented Grape Juice
Apr 56, 12p

Keywords: *Industrial plants, Food processing, Manufacturing, *Beverages, Grapes, Pasteurizing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Industrial management, Production planning, Cost estimates, Labor estimates, Sanitation, *Food products, *Fruits, Developing country application.

The report outlines the type of plant required for processing of fifteen tons of unfermented grape juice per day. Pressing juice out of grapes and processing the liquid into marketable grape juice requires, (a) the most careful selection of equipment which can be operated economically for fifteen tons of grapes per day, (b) maintaining the proper temperatures necessary for successful pasteurization, and (c) adhering strictly to established standards of cleanliness and sanitation. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 711/9 PC A03/MF A01
United States Testing Co., Inc., Hoboken, NJ.
Plant Requirements for Manufacture of Antibiotics
Aug 62, 47p

Keywords: Antibiotics, Manufacturing, Requirements, Penicillins, Streptomycins, Tetracyclines, Equipment, Specifications, *Drugs, *Industrial plants, Pharmaceutical industry, Developing country application.

The report presents the establishment of a typical pharmaceutical plant, staffed and equipped to manufacture the antibiotics penicillin, streptomycin and tetracycline. Due to the nature of the products, parameters, and manufacturing processes, the operation is, of necessity, a large one. The brochure is one of a series of reports resulting from overseas technical inquiries on factory or commercial establishments, operation, management and engineering.

PB-292 718/4 PC A03/MF A01
Council for International Progress in Management (USA), Inc., New York.
Problems in Business Management: Incentive Plans
Jun 62, 47p ICA-TB-31

Keywords: Bonuses, Incentive contracts, Personnel management, Incentives, Fringe benefits, Productivity, Efficiency, Industrial relations, Job analysis, Work time standards, Work measurement, Salary administration, *Management techniques, Blue collar occupations, Business administration, Developing country application.

The brochure is one of a series of training courses in 'Problems in Business Management'. It outlines information on establishing incentive plans for factory workers and discusses bonus systems for output quantity and work economy.

PB-292 719/2 PC A04/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Effective Job Organization
Apr 61, 64p Rept no. TB-23

Keywords: *Management training, Personnel development, Organization theory, Industrial management, Executives, Planning, Decision making, Efficiency, Job analysis, Manuals, Scheduling, Supervision, Job utilization, Administrative principles, Administrator responsibility, Skill development, Job enrichment, Organizational effectiveness, Developing country application.

The report explores in detail the executive's responsibility for clarifying jobs, for delegating, for planning, for decision-making, and for generally improving habits of personal efficiency. It probes deeply into the techniques and principles of executive and administrative action. It is designed for managers with some years of experience who can discuss the practical problems of organization that will help to improve their own skills and help their subordinates to perform more effectively.

PB-292 720/0 PC A03/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Industrial Training Charts
Mar 61, 39p Rept no. TRAINING MANUAL-37

Keywords: *Management training, Industrial training, Manuals, Charts, Personnel development, Supervision, Job utilization, Job analysis, Planning, Decision

making, Scheduling, Industrial relations, Meetings, Leadership, Supervisory methods, Developing country application.

The pamphlet contains a collection of charts for use in Management and Supervisory Training programs. The charts are directly applicable to supervisory training manuals, particularly the following: Conference Leadership, Job Instruction Training, Job Methods Training, Job Relations Training.

PB-292 721/8 PC A05/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Training Course in Material Handling
Mar 61, 91p Rept no. TECHNICAL BULL-11

Keywords: Specialized training, *Materials handling, Industrial training, Supervisors, Developing countries, Guidelines, Attitudes, Motivation, Elevators(Lift), Conveyors, Fork trucks, Hoists, Pallets, Cranes(Hoists), Chutes, Efficiency, Work elements, Work measurement, Elevators(Lifts), *Training, Developing country application.

Training in Material Handling is a course which points out the many opportunities that are presented for increasing production, lowering costs and increasing wages through application of modern methods in material handling. The objective of the course is to demonstrate that through the application of sound practice or a well-conceived system materials can be transported from and to storage and through all production stages with a minimum of transfer and handling. Efficiencies in both handling and in total movement of materials avoids production delays, reduces congestion, prevents loss of operation or time, minimizes utilization of machinery and equipment and expedites routing and shipping. Industry spends enormous sums of money for research and development directed towards many types of improvement, such as design engineering, cost engineering, safety engineering and others, but one of the greatest opportunities for reducing manufacturing cost and materially increasing manhour production is frequently neglected. The aim of this course is assist supervisors to eliminate obvious and unnecessary movements in the handling and transporting of commodities and materials.

PB-292 730/9 PC A04/MF A01
Armstrong Cork Co., Lancaster, PA.
Industrial First Aid Training
7 Jan 52, 51p ICA-TB-19

Keywords: Industrial medicine, First aid, Manuals, Injuries, Patients, Transportation, Therapy, Dressings, Resuscitation, Illnesses, Health manpower education, *Health education, Developing country application, Occupational health and safety.

The first aid training manual has been written to help teach supervisors and other personnel the basic principles and practices necessary for the temporary care of injured or ill employees. In turn, their application of these principles will reflect the thoroughness of the teaching.

PB-292 731/7 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Supervisory Development Program
1961, 26p Rept no. TECHNICAL BULL-6

Keywords: *Management training, Supervision, Manuals, Methods, Objectives, Personnel development, Management analysis, Industrial relations, Supervisors, Education, *Training, Developing country application, Management education.

The manual is one of a series of training manuals for use in establishing supervisory training programs. It covers the philosophy of training, the need for training, general concepts, general objectives, scope of the program and the training plan.

PB-292 744/0 PC A05/MF A01
Armstrong Cork Co., Lancaster. PA.
Plant Fire Brigade Training
May 62, 78p ICA-TB-18

Keywords: Fire fighting, Specialized training, Industrial plants, Organizing, Personnel selection, Instructional materials, Manuals, *Fire safety, Developing country application.

This training manual gives the purpose, organization and responsibilities of a Plant Fire Brigade, what is fire, how fire burns, plant fire protection - chemical extinguishers, field demonstration - chemical extinguishers, plant fire protection - water equipment, inspection - built in protection and brigade equipment, fighting a simulated fire and general safety precautions in fighting plant fires.

PB-292 745/7 PC A10/MF A01
International Science and Technology Inst., Inc., Washington, DC.
Potential Use of Small Dams to Produce Power for Low-Income Communities
Mary M. Allen. 4 Aug 78, 220p
Contract CSA-B8B-5584
Prepared in cooperation with Polytechnic Inst. of New York, Brooklyn. Center for Regional Technology.

Keywords: *Hydroelectric power, *Dams, *Electric power, Low income groups, Communities, Regional planning, Environmental impacts, Safety, Economic analysis, Constraints, Developing country application.

An alternative source of energy which would have a stable cost and alleviate the economic strain of rising fossil fuels is the development of small dam sites to produce hydroelectric power. This report addresses the many issues involved in estimating the potential contribution of hydropower to the energy supply. The issues discussed include: (1) physical characteristics, (2) environmental and safety considerations, (3) institutional constraints, (4) economic issues, and (5) current governmental programs.

PB-292 746/5 PC A03/MF A01
Department of Agriculture, Washington, DC.
Construcciones Resistentes Al Fuego - En El Hogar - Y En La Granja (Fire Construction of the Home--- of Farm Buildings)
Merril S. Himmins, Jr. 1968, 31p Rept no. USDA/BULL-2227
Text in Spanish.

Keywords: Residential buildings, Farm buildings, *Fire safety, Flameproofing, Barriers, Construction, Fire resistant materials, Fire protection, *Houses, Developing country application, Fire barriers.

In order that the farm be as safe from fires as possible, the distance between the home, barn, silo and other out buildings is specifically outlined along with the construction design for additional fire barriers. Fire barriers for the home have been designed for the basement, walls and stairs utilizing wooden blocks placed in strategic areas. Correct chimney construction, radio and television antenna installation and other areas sensitive to fire in the area of the roof are discussed. Also covered in this report is the installation and fireproofing of gas and oil furnaces, floor registers, wood burning stoves, lightning rods and electrical wiring. Because of the number of fires caused by spontaneous combustion and unsafe drying and/or heating methods in the stable, tobacco barn, grain elevator, poultry house and workshops, their proximity to equipment and other farm buildings and their fire barriers are outlined.

PB-292 747/3 PC A07/MF A01
Texas Transportation Inst., College Station.
Manual Para La Construccion de Casas de Tierra (Handbook for Building Homes of Earth)
Lile A. Wolfskill, Wayne A. Dunlap, and Bob M. Gallaway. 1966, 143p Rept no. BULL-21-E-14-63
Text in Spanish.

Keywords: *Houses, Construction materials, *Soils, Soil stabilization, Foundations, Soil compacting, Blocks, Weatherproofing, Coating processes, Manufacturing, Manuals, *Adobe, Developing country application, Earth construction.

Contents: Introduction - Types of earth houses; Soils and what can be done with them; Soil stabilizers; Site preparation; Foundations; Lightweight roofs; Getting the soil prepared; Making abode blocks; Making pressed earth blocks; Making walls of pressed blocks; Making walls of rammed earth; Roofs for earth houses; Floors for earth houses; Surface coatings.

PB-292 754/9 PC A03/MF A01
Armstrong Cork Co., Lancaster, PA.
Selection and Training of New Foremen
3 Feb 54, 47p ICA-TB-15

Keywords: Personnel selection, Supervisors, Production management, Industrial training, Leadership, Supervision, Performance evaluation, Experience, Interviews, Intelligence tests, Attitudes, Industrial plants, Qualifications, *Management training, *Training, Supervisor qualifications, Supervisory training, Developing country application.

The manual is one of a series of training manuals. Its purpose is to assist line management in identifying the best qualified hourly workers and feeding them into shift foremanship openings as they occur. The plan combines a proven comprehensive selection procedure with an intensive period of training for those selected. Its net result is an increase in the certainty that foremen picked from the hourly production group are--within the limits of those available--those individuals with the greatest capabilities and potential.

PB-292 766/3 PC A02/MF A01
Department of Agriculture, Washington, DC.
Ganado Bovino Para Carne - Descorne, Castracion, Marcacion a Hierro, Marcas (Beef Cattle - Dehorning, Castrating, Branding and Marking)
R. T. Clark, A. L. Baker, and George E. Whitmore.
1968, 20p Rept no. USDA/BULL-2141
Text in Spanish.

Keywords: Cattle, Marking, Castration, Livestock, Methodology, *Animal husbandry, Developing country application, Dehorn.

Complete and detailed instructions of several different methods used to dehorn, castrate, brand and mark cattle are discussed in full. Dehorning--The age of the cow is an important factor and will determine if the Caustic Soda method is applied (just a few days old); or if the Spoon or Tube method is used (less than 60 days old). Any cow older than this is dehorned using the electric dehorning iron, gougers, or electric dehorning saw. Castration--Three surgical methods are explained along with two non-surgical methods; Clamping or Pinching which uses the Emasculatome; or the Elastrator which uses hard rubber bands. The neutering of cows is also discussed. Branding and Marking--Branding by heat and iron or liquid chemical is given full explanation as is further markings by nitching ears and tattooing.

PB-292 767/1 PC A08/MF A01
Department of Agriculture Extension Service, Washington, DC.
Homemaking Around the World
Nov 73, 167p

Keywords: Food preparation, Nutrition, Health, Sanitation, Houses, *Clothing, *Children, Developing countries, *Home economics, Child care, Developing country application.

The publication shows ways in which the basic principles of sound home economics may be applied in every home the world over to make living more satisfying. The information represents the pioneering experience of trained people in many countries. Topics covered include child care, foods and nutrition, health and sanitation, housing and home improvement, and care and construction of clothing.

PB-292 769/7 PC A02/MF A01
Gidley Research Inst., Fairhaven, MA.
Plant Requirements for Manufacture of Rubber Soling
Sep 56, 23p

Keywords: *Industrial plants, Manufacturing, Elastomers, *Footwear, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Soles.

Rubber soles for footwear are fabricated and combined with shoe uppers by three general methods. The first method is the forming of a patterned, uncured sole

and cementing it on a fabric upper section and then curing the entire assembly on a last (as in a vulcanizer or autoclave). This is the conventional method long used in making tennis shoes. The second method is to join a slab (without pattern) of rubber compound directly to a fabric or leather upper section in an automatic heated mold under pressure. This method employs a special machine--typical of which (though varying in design and merits) are the Goliath, Pinto, Bata, Marvel and Desmer machines. The method described in the report is to separately fabricate and cure (with or without a pattern) the soling itself. The cured or vulcanized soling is then attached to a fabric or leather upper by cementing, sewing or nailing--or combinations of these methods. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 772/1 PC A05/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Job Relations Training Manual
1961, 90p Rept no. TECHNICAL BULL-3

Keywords: Industrial relations, *Management training, Manuals, Supervision, Education, Sociology, Motivation, Personnel management, Psychology, Attitudes, Supervisors, Industrial training, *Training, Developing country application, Employer employee relationship.

The manual is designed as a management tool for training supervisory personnel in industry, particularly those supervisors in developing countries.

PB-292 784/6 PC A04/MF A01
Wolf Management Engineering Co., Chicago, IL.
Sash and Door Plant; A Reference for use in Planning New Industrial Facilities
Feb 57, 68p
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Keywords: *Industrial plants, Manufacturing, *Wood products, Requirements, Production management, Production methods, Production capacity, Operating costs, Lumber, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Windows, Doors, Stairways, Moldings, Woodworking, Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant to be located in a foreign country to engage in fabrication of certain wood products from lumber which has been seasoned and surfaced. Because of the many types of wood products which are manufactured, this report is restricted to the operation of a Sash and Door Plant, as it is usually termed, which makes not only windows and doors, but other items of exterior and interior trim, such as moldings, stairways, and the cabinet work which is generally used in residences, schools, churches, hospitals, offices and stores. The information includes a general description of the usual steps in the manufacturing processes, with notes on materials, machinery, layout, and accounting procedures.

PB-292 785/3 PC A03/MF A01
Holman (John F.) Co., Inc., Washington, DC.
Plant Requirements for Manufacture of Bicycle Tires and Tubes
Jan 62, 32p

Keywords: *Industrial plants, Manufacturing, *Tires, *Tire tubes, Bicycles, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The manufacturing plant described in this brochure is designed to produce bicycle tires made of natural rubber at the rate of approximately 500,000 per year. The tires considered here are of the pneumatic type that require an inner tube. This plant is assumed to produce natural rubber tubes at the same rate as the outer casings. Tire size is assumed to be either 26-inch or 28-inch diameter to fit an adult size bicycle. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 786/1 PC A03/MF A01
Andrews (George H.)Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Centrifugal Cast Iron Pipe
Feb 62, 36p

Keywords: *Industrial plants, Manufacturing, Cast iron, *Pipes(Tubes), Centrifugal casting, Requirements, Production management, Production methods, Production capacity, Operating costs, Iron, Scrap, Pig iron, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Foundries, *Casting, Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant to produce centrifugal cast iron pressure pipe in a foreign country. Plants producing centrifugal cast iron pressure pipe in the United States are usually designed for a much larger volume of production. However, the processing methods and equipment described in this report are modern and conform to those now being used in the United States. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 790/3 PC A07/MF A01
Overseas Development Council, Washington, DC.
Energy for the Villages of Africa. Recommendations for African Governments and Outside Donors
James W. Howe. 25 Feb 77, 146p

Keywords: *Africa, Developing countries, Rural areas, Communities, Solar energy, Biomass, Hydroelectric power generation, Agricultural wastes, Wood, Reviewing, Recommendations, Energy sources, Energy requirements, Developing country application, Wind power, *Energy source development.

This report examines the subject of energy for the villages and farms of Africa and recommends a course of action for African policy makers and outside donors. Village source energy includes those forms of primary energy found in the villages and farms such as the sun, wind, water, animal and crop waste, and wood. The report outlines a course of action for developing the information needed for Africans to make two decisions: (1) whether village-source energy warrants use on a wide scale and if so, (2) what system to use to match energy hardware with village needs and to install it in villages together with a support system that will maintain it, provide repairs and spare parts, and generally keep it operating.

PB-292 799/4 PC A03/MF A01
International Cooperation Administration, Washington, DC. Technical Aids Branch.
Using Job Instruction Training
1962, 46p Rept no. TECHNICAL BULL-8

Keywords: *Management training, Supervisors, Personnel developments, Supervision, Job analysis, Instructions, Scheduling, Human factors engineering, Leadership, Production control, Personnel management, *Training, On job training, Developing country application.

The bulletin is a plan to make job instruction training a regular part of a plant's day-to-day operation. This 10-hour session outline is a follow through program to coach supervisors in normal operating functions. Getting supervisors to use this practical plan will accomplish a far-reaching purpose, as it makes the development of a well-trained work force a function of the line operation.

PB-292 800/0 PC A03/MF A01
Vitro Corp. of America, Washington, DC.
Plant Requirements for Manufacture of Galvanized Steel Pipe
Mar 62, 37p
Prepared in cooperation with Morris and Van Wormer, New York.

Keywords: *Industrial plants, Manufacturing, *Pipes(Tubes), Galvanized materials, Cold rolling, Resistance welding, Requirements, Production management, Production methods, Production capacity, Operating costs, Zinc, Steels, Metal strips, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Plugs, Bushings, Couplings, Water pipes, Gas pipes, Developing country application.

The purpose of the report is to present basic information relative to the establishment in a foreign country of a factory designed to produce certain sizes of galvanized steel pipe. This type of pipe is used for water, air, gas, oil, or other fluid lines, and for structural purposes such as fence posts, scaffolding, and railings. The proposed plant is about the minimum feasible size and will require a substantial capital investment and a small number of skilled workers. Profitable operation in industrially developing countries will depend upon the following factors: (1) the availability of steel strip and slab zinc (spelter) from nearby mills, or the presence of a sufficiently large domestic market, in the absence of a local supply of steel and zinc, sufficiently large to overcome the expense of imported materials; and (2) the availability of accessories such as galvanized couplings, nipples, elbows, unions, plugs, tees, guards, reducers, and bushings. Association with a facility producing the fittings would be advantageous for the pipe manufacturer. The report describes a plant manufacturing pipe threaded on both ends and not equipped with accessories. The pipe may be supplied unthreaded or it may be equipped with couplings or thread guards at an additional cost. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 801/8 PC A05/MF A01
Mayer (Frank) Engineering Co., Los Angeles, CA.
Plant Requirements for Manufacture of Bottled Oxygen and Acetylene
Mar 62, 87p

Keywords: *Chemical industry, *Industrial plants, Manufacturing, *Oxygen, *Acetylene, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report outlines the basic processes, plant requirements and economic factors involved to establish a small plant in a foreign country for the production of oxygen and acetylene for commercial use. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture

of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 802/6 PC A03/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements for Manufacture of Standard Sport Stockings
Mar 62, 34p

Keywords: *Industrial plants, Manufacturing, Socks, Cotton spun yarns, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Knitting, Textile processes, *Clothing, Developing country application.

The purpose of the report is to present basic information for establishing and operating a small plant in a foreign country for the manufacture of men's stockings to be used by baseball and soccer players. Boy scouts sometimes wear these stockings. All stockings of this type are made by the knitting process. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 803/4 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to Set Up and Operate a Leather Tannery
May 59, 45p

Keywords: *Industrial plants, Manufacturing, *Leather, Requirements, Production management, Production methods, Production capacity, Operating costs, Hides, Tanning materials, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Tanneries.

Most tanneries in the United States perform two functions, namely, processing the hide to pelts and tanning the pelts to the finished product, leather. Tanning of leather can be accomplished by any of the six well-known processes: vegetable, alum, chrome, oil, formaldehyde, and sulphur. The two most widely used today are the vegetable and the chrome. Due to the relatively large demand for upper shoe leather, this manual will be developed on processing hides from their raw state to finished upper leather by using the two-bath chrome tanning process. The most desirable upper leather is secured from light cattle hides which weigh approximately 54 pounds each. These hides are purchased by the pound, the average cost being $0.13 per pound; the finished leather product is sold on the square footage basis at approximately $0.35 per square foot, or $0.298 per pound. The tannery herein proposed will be capable of processing 16,000 pounds of raw hides to yield 13,500 square feet of finished upper leather per eight-hour day, utilizing about 56 workers, and would be of minimum economic size. Annual cost of hides, 4,000,000 pounds, at $0.13 per pound = $520,000. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 612/5 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Concrete Posts
Oct 62, 38p

Keywords: *Industrial plants, Manufacturing, *Concrete, *Fences, Concrete products, Columns(Supports), Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce concrete fence posts. In addition to fence posts, the equipment listed in the report will produce posts of all kinds and shapes up to 16 inches by 16 inches in diameter as well as such products as window sills, door sills, coping, cornice, lintels, decorative blocks, screen blocks, lamp posts, fancy wall blocks, and porch columns. For the purpose of the report only concrete fence posts are considered. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 813/3 PC A19/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Proceedings of the U.S.-Southeast Asia Symposium on Engineering for Natural Hazards Protection Held at Manila, Philippines on September 26-30, 1977
1978, 438p NSF/RA-780524
Contract NSF-INT77-15418

Keywords: *Buildings, Structures, Hazards, Meetings, Earthquakes, *Floods, Hurricanes, Storms, Safety engineering, Philippines, *Earthquake engineering, Wind loads, *Natural hazards.

This volume contains a collection of thirty papers presented at the U.S.-Southeast Asia Symposium on Engineering for Natural Hazards Protection held in Manila, Philippines. The papers focus on research in risk and safety analysis and the design of structures regarding earthquakes, wind forces, landslides, storms, floods, hurricanes, and extreme events in general. Included in each of the papers is a synopsis, introduction, description of research, mathematical analyses, conclusions, references, and figures. The research represents work performed in the continental United States, Hawaii, the Philippines, Japan, Thailand, Singapore, New Zealand, and Australia. A concluding paper on the damages resulting from the Mindanao Earthquake of August 17, 1976 represents some engineering lessons learned from the damages and makes some recommendations for seismic code revisions under Philippine conditions.

PB-292 816/6 PC A03/MF A01
Appropriate Technology Group, Oskaloosa, KS.
Wind Driven Water Pumps. Economics, Technology, Current Activities
Steve Blake. cDec 78, 29p*
Prepared for International Bank for Reconstruction and Development, Washington, DC.

Keywords: Windmills, Pumping, Water, Cost analysis, Well pumps, Technology, *Wind energy, *Water pumps, Developing country application, Savonius rotors.

The illustrated handbook discusses the economics and the characteristics typical of the aermotor windmill and the indigenous windmill. Since the use of windmills can have worldwide impact upon the development and upgrading of water supplies, an emphasis is placed upon the importance of supplying this technical information to the developing countries of the world.

PB-292 821/6 PC A03/MF A01
Wolf Management Engineering Co., Chicago, IL.
Plant Requirements for Manufacture of Refrigerated Walk-In Coolers
Sep 57, 26
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Coolers, Refrigerators, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The subject of the report is the manufacture or fabrication of commercial or walk-in coolers. It is intended to present the data in a form that a potential plant operator would find useful to consider before entering the business of making walk-in coolers. Before undertaking the manufacture of walk-in coolers, the prospective investor is advised to have a complete administrative, operating and financial analysis made by a reputable firm of management engineers. The report is one of a series of reports resulting from overseas technical inquiries on factory establishments, operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type.

PB-292 822/4 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Dehydrated Molasses
Sep 61, 33p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Molasses, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a by-product plant to produce dehydrated molasses from blackstrap molasses. Blackstrap molasses is a by-product of the sugar refining industry. The molasses has a high food value and can be used advantageously as a diet supplement in animal feeding. The equipment should be installed by a sugar refining company at its refinery in order to eliminate freight and storage costs of the blackstrap molasses which would occur if the plant were located elsewhere. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 823/2 PC A03/MF A01
Wolf Management Engineering Co., Chicago, IL.
Plant Requirements for Manufacture of Manganese
May 57, 37p

Keywords: *Industrial plants, Manufacturing, *Manganese, Requirements, Production management, Production methods, Production capacity, Operating costs, Metalliferous minerals, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report is concerned primarily with the processing of the mineral-bearing ore into material for use as a reagent in steel making (its principal use) and as an ingredient in special alloy steels, with limited mention of its secondary use in the chemical industry and battery manufacturing. These, in reality, are the three prin-

cipal uses. The report presents the electrolytic process as one of the acceptable types of processes designed to give satisfactory production with reasonable assurance of a successful operation. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 824/0 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to Set Up and Operate a Gray Iron Jobbing Foundry
May 59, 40p

Keywords: *Industrial plants, Gray iron, *Foundries, Cast iron, Requirements, Molding techniques, Pattern making, Operating costs, Materials estimates, Equipment, Plant layout, Industrial management, Financial management, Production planning, Cost estimates, Labor estimates, *Casting, Developing country application.

Because of the variety of metals used and the limitless number of items that are cast, it is difficult, if not impossible, to make generalized statements regarding cost of production and equipment requirements that are comprehensively accurate. Because iron castings are most widely used, the discussion concerns itself with what is known as gray iron castings. A further complication arises in that foundries are of two general types--production and jobbing. Production foundries may be departments of large establishments engaged in the mass production of items, of which the casting is only one step in the entire process of manufacture and assembly; or they may be independent foundries making many identical castings where work is repetitive and the foundry process is highly mechanized in order to secure minimum costs. Not only is much of the work done on machines, but the handling of materials is almost completely conveyorized. The job foundry, on the other hand, stands ready to produce for any customer who comes along, provided the foundry has facilities suitable to make the castings required. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 825/7 PC A02/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements for Manufacture of Metal Spinning Products
Apr 56, 11p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Metal shapes, Spinning(Extruding), Metal extruding, Requirements, Production management, Production methods, Production capacity, Operating costs, Bronzes, Steels, Aluminum, Copper, Materials estimates, Equipment, Plant layout, Machinery, Tools, Industrial management, Production planning, Cost estimates, Labor estimates, Metal working, Developing country application.

The report outlines the type of plant required for the manufacture of metal shapes formed by means of spinning and its advantages. Metal spinning is a skillful art of folding a flat piece of pliable thin sheet metal over the contours of a pattern. Folding is done by applying a specific spinning tool either by hand or by mechanical means to the fast-rotating sheet metal. The metal may be ferrous or non-ferrous. The tool can be simple or complicated, depending on the shape of the chuck. Present-day spinning techniques permit many ways of fashioning sheet metal shapes, and is favored by metal working shops in many cases. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 826/5 PC A03/MF A01
Vitro Engineering Co., Washington, DC.
Plant Requirements for Manufacture of Block Ice
Mar 62, 31p

Keywords: *Industrial plants, Manufacturing, *Ice, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce block ice. All information and figures contained are based on the production of clear, pure ice in block form. Water is the only raw material used in the manufacturing process. The report is based on the production of ice made with water obtained from an approved municipal supply system. Prior to manufacture, the water must be subjected to a softening process to remove dissolved mineral compounds such as calcium, magnesium, and iron. If the water is obtained from natural sources such as wells, rivers, or lakes, it must be treated to remove impurities of a bacterial nature in addition to the softening process. The plant is designed to produce 10 tons of ice per day or 3,650 tons per year in 300 pound blocks. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 827/3 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Plant Requirements for Manufacture of Abrasive Wheels
May 59, 36p

Keywords: *Industrial plants, Manufacturing, Grinding wheels, Tools, *Abrasives, Aluminum oxide, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report describes a plant to manufacture a general purpose wheel. The resinoid type of bond is used because of the comparatively simple process in manufacture. The type of abrasive is aluminum oxide--a common type. The equipment described can produce plain disk wheels ranging from 2 inches diameter x 1/4 inches thick to 8 inches diameter x 1 inch thick. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 828/1 PC A03/MF A01
Vitro Engineering Co., Washington, DC.
Plant Requirements for Manufacture of Stainless Steel Utensils
Mar 62, 36p

Keywords: *Industrial plants, Manufacturing, Stainless steels, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Kitchen equipment and supplies, Developing country application, Utensils.

The purpose of the report is to present basic information for establishing a small factory to manufacture stainless steel utensils in a foreign country. Stainless steel, a corrosion and heat resistant alloy, is very suitable for the fabrication of utensils to be used in restaurants, hospitals, military institutions, industries, or homes. Small utensils of this type, up to 5 inches in diameter, are usually pressed or drawn on a light hydraulic press; while those over 6 inches in diameter are spun on a lathe. They may be produced in a variety of types and sizes such as shallow or deep bowls, cups, pans, and pots; and narrow or wide-necked jugs or cylinders. It is suggested that only simple shapes be processed at first to suit the local needs. Later, the types of items can be widely diversified, and the production rate increased to comply with an expanding domestic market. The plant proposed herein is about the minimum feasible size. It will require a modest capital investment in machinery and tools, and a small labor force of skilled metal workers. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 829/9 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Coarse Wrapping Paper
May 59, 36p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Kraft paper, Paper mills, Requirements, Production management, Production methods, Production capacity, Operating costs, Wood pulp, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Papermaking, *Paper, Developing country application.

The purpose of the manual is to present basic information for establishing and operating a small coarse wrapping paper mill in a foreign country. The plant is designed to produce one-ton of coarse wrapping paper per hour. The plant may be operated as many hours per day as desired, since no difficulties are presented in closing down and starting up the operations. Only about 15 minutes preparation is required to start production and only about five minutes preparation is required to stop production. Based on current practice, in the United States, this is a small plant. The recommended equipment and production methods are modern and have proven profitable when operated under conditions comparable to those assumed. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 830/7 PC A03/MF A01
Vitro Engineering Co., Washington, DC.
Plant Requirements for Manufacture of Copper Tubing
Mar 62, 34p

Keywords: *Industrial plants, Manufacturing, Copper, Metal tubing, Extrusions, Requirements, Production

management, Production methods, Production capacity, Operating costs, Copper, Ingots, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Extruders, Presses, Metallurgical furnaces, *Pipes(Tubes), Developing country application.

The purpose of the report is to present basic information relative to the establishment of a small copper tubing plant in a foreign country. This plant is designed to produce seamless, thin-walled, flexible, copper tubing by the extrusion method only. This tubing is generally used with solder type fittings, requiring no threads, and comes in two types: K (heavy duty), and L (light duty), the only difference being the wall thickness. The report is based on the manufacture of type K only, which is suitable for general plumbing and heating purposes, underground usage, and for gas, steam, and oil lines. This plant, which is about the minimum feasible size, will require a substantial capital investment; however, it can be operated by a relatively small number of skilled workers. Profitable operation in industrially developing countries will depend upon two main factors: (1) the availability of locally mined and refined copper to provide low cost ingots thus enabling the plant to export its products; and (2) the presence of a sufficiently large domestic market, in the absence of domestic copper, to overcome the expense of imported ingots. Association of this tubing plant with a copper wire drawing facility would result in considerable savings and increased profits since the tubing extruder could produce the 5/16 inch copper rod required by the wire plant. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 831/5 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Chrome Tanned Leather
Sep 61, 40p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Leather, Requirements, Production management, Production methods, Production capacity, Operating costs, Hides, Tanning materials, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Tanneries.

The purpose of the report is to present basic information for establishing a small leather tanning plant in a foreign country. The product produced in this plant is a good grade of chrome tanned leather, the annual capacity being 185,000 square feet. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 854/7 PC A16/MF A01
Hosken (Franziska P.), Lexington, MA.
International Directory of Women's Development Organizations
Franziska P. Hosken. 1977, 362p*
Contract AID/ta-C-1176

Keywords: Organizations, Females, Directories, Professional personnel, Personnel development, Social organizations, Communicating, Foreign countries, United States, *Women, Developing country application.

Women's organizations represent a huge resource and an enormous quantity of talent which all too often are only partially used by society. The purpose of this Directory is to provide the basic contacts for communication among women's organizations, resource groups, and the international development community. It is a useful compilation of women's professional, business, and social groups worldwide. This Directory will serve as a useful reference tool for all those desiring to expand their contacts and perspectives for involving more women in the development process.

PB-292 856/2 PC A12/MF A01
ACTION/Peace Corps, Washington, DC.
Teaching Conservation In Developing Nations
Judith Brace, Ralph R. White, and Stephen C. Bass. 1977, 262p
Sponsored in part by National Audubon Society, New York. Report on Appropriate Technologies for Development Series, Number Seven.

Keywords: Conservation, *Natural resources, *Education, Developing countries, Instructional materials, Manuals, Project planning, Buildings, Concepts, Soil conservation, Ecology, Landscaping, Erosion, Food chains, Animals, Plants(Botany), Training devices, Visual aids, Developing country application.

The goal of conservation education is to lead the public through a series of steps about nature, land, and natural resources which include: awareness, understanding, respect, responsibility, and action. This manual provides ideas, activities, and resources for incorporating conservation education into day-to-day community activities. It is structured around a local center which can be used to present an on-going conservation education program by means of pictures and posters, exhibits and collections, films and discussions.

PB-292 857/0 PC A11/MF A01
ACTION/Peace Corps, Washington, DC.
Reforestation in Arid Lands
Program and training journal manual series
Fred R. Weber, Frederick J. Holman, and Virginia C. Palmer. c1977, 244p Rept no. MANUAL SER-5
Report on Appropriate Technologies for Development Series, Number Three. Also pub. as VITA Publications manual series no. 37E.

Keywords: Reforestation, West Africa, Developing countries, *Arid land, Manuals, Conservation, Planting, Soil properties, Water supply, Planning, Site surveys, Plant reproduction, Seeds, Cultivation, Forest trees, Identifying, Forest fires, Fire prevention, Climate, Financing, *Forestry, Developing country application.

Reforestation efforts are begun for the important reasons of conserving and protecting, and to increase production of forestry resources. Reforestation projects have been of great importance over the past few years in Africa. This manual is an attempt to present some current examples of forestry programs in West Africa. It is based upon the collective experiences of foresters and of local farmers and herders. Many of the problems of reforestation of dry areas are the same worldwide. Presented in the manual are methods and planning guides which can be of great benefit in the arid areas of the world.

PB-292 860/4 PC A04/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Farm Hand Tools
May 59, 51p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Tools, Requirements, Production management, Production methods, Production capacity, Operating costs, Forging, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Power equipment, Hammers, Rakes, Forks, *Hand tools, Developing country application.

The manual covers tools for the farm that are used through the application of human effort. It does not encompass farm implements that are operated through animal or mechanical energy. The primary process used in the production of these farm hand tools in the plant discussed is forging. Because the volume of production covered by this manual will not be sufficient to justify costly drop forging equipment and its accompanying expensive dies, the process of hammer forging by power hammers is proposed. This process is essentially the art of blacksmithing. In addition some of the skill required by the blacksmith to form properly the article he is forging is transferred to the dies used in the power hammers. These dies have simple contours in them that tend to produce the desired shape automatically. Nevertheless, a fairly high degree of skill is required on the part of the hammerman who operates a power hammer. In addition to power hammers, a mechanical forging press is also required to obtain uniformity in the shape of certain tools and to produce shapes that would otherwise be very difficult to obtain. The other operations and pieces of equipment needed in the proposed plant are also discussed. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 861/2 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Sheet Glass
May 59, 35p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Sheet glass, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Glass, Developing country application.

The small glass plant described in the report is intended to manufacture sheet glass in a foreign country. It is considered to be the smallest size modern sheet glass plant that can be economically operated. The plant is designed to use the Fourcault process for the production of window glass. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 863/8 PC A03/MF A01
Economic Research Service, Washington, DC. Development and Trade Analysis Div.
How the United States Improved Its Agriculture
Raymond P. Christensen, William E. Hendrix, and Robert D. Stevens. Mar 64, 39p Rept no. ERS/FOREIGN-76

Keywords: *Agricultural economics, Production, Investments, Natural resources, *United States, Education, Management, Output, Employment, Capital, Manpower, Income, Developing country application.

This publication is a concise but comprehensive study listing numerous interrelated factors which have contributed to the large output and high productivity of American agriculture. They include: (1) A large supply of land and water resources, (2) large investments for education that improve human skills and managerial abilities; (3) development and diffusion of new knowledge about agricultural technology; (4) complementary industrial development that supplies capital inputs for agriculture and nonfarm employment opportunities for people not needed in agriculture; (5) a structural organization of farm production and marketing that provides powerful economic incentives for farmers and marketing firms to increase output and productivity;

and (6) public and private institutional services that (a) help conserve and improve natural resources, (b) increase the fund of knowledge about improved agricultural technology, (c) encourage capital formation and investments in agriculture, and (d) assure farm people that they will share in the economic benefits of increased production.

PB-292 864/6 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Sulfuric Acid
Oct 61, 31p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Chemical industry, *Industrial plants, Manufacturing, *Sulfuric acid, Requirements, Production management, Production methods, Production capacity, Operating costs, Process charting, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a plant in a foreign country to produce sulfuric acid. Sulfuric acid is one of the most important materials upon which our industrial society depends. The following is a partial list of the industries which are its consumers: agriculture, chemical, petroleum, coal products, iron and steel, paints and pigments, rayon and cellulose film. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 865/3 PC A04/MF A01
Maynard (H. B.) and Co., Inc., Pittsburgh, PA. Methods Engineering Council Div.
Plant Requirements for Manufacture of Laundry and Milled Toilet Soap
May 57, 71p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Soaps, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report outlines the type of plant required for the manufacture of laundry and milled toilet soap. Two plans are specified one with a capacity of three tons per day, and the other with a capacity of three tons per week. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 869/5 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to Set Up and Operate a Small Steel Melting Plant
Sep 57, 33p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Steel plants, Melting furnaces, Manufacturing, Ingots, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal scrap, Materials estimates, Equipment, Plant layout, Industrial management, Production planning, Cost estimates, Labor estimates, Cast products(For reworking), *Steel industry, Developing country application, Steel 1010, Steel 1020.

The small steel melting plant described in the report is intended to manufacture ingots or billets from scrap metal where the demand for such products exists and where such a local operation would be practicable. The product of this plant is intended for use in a small steel rolling mill to produce concrete reinforcing bars and merchant shapes. Either ingots or billets can be produced in the plant. However, for the purpose of simplification, only ingots are discussed in the report. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 871/1 PC A04/MF A01
Ghana Academy of Sciences, Accra.
Better Vegetables, Ghana Handbook
Daniel A. Sekyere, and Sandy J. McCorvey. Jul 67, 54p
Sponsored in part by Agency for International Development, Accra (Ghana).

Keywords: Tropical regions, Vegetable plants, Horticulture, *Ghana, Developing countries, Cultivation, Hand tools, Soil properties, Water supply, Planting, Mulches, Sterilization, Protection, Seeds, Fertilizers, Plant diseases, Pest control, Manuals, Africa, *Vegetables, Developing country application.

This bulletin is to stimulate interest in increased vegetable production and to assist prospective gardeners toward growing a quality product for market. Much practical information is given on all facets of vegetable growing: preparing the site, transplanting, the culture of vegetables, specific local vegetables, and soil sterilization. This handbook is based on the three major climatic zones found in Ghana and other countries on the West Coast of Africa. These zones may be identified as coastal, forest, and savannah.

PB-292 874/5 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Economics Training
Technical bulletin.
Oct 56, 34p Rept no. TB-22

Keywords: Economics, Specialized training, Manuals, Objectives, Economic conditions, Prices, Supply(Economics), Demand(Economics), Salaries, Productivity, Value, Economic factors, Cost analysis, Government, Instructional materials, Education, *Education, *Training, Money systems, Expenditures, Developing country application.

The document describes an economic training program for employees which contains basic elements of economics in four sessions: (1) The system in which we live; (2) The cost of government; (3) Money and prices; and (4) Wages and productivity.

PB-292 878/6 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Two-Burner Gas Plates
May 59, 31p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Gas appliances, Stoves, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Kitchen equipment and supplies, Developing country application, Gas plates.

The report outlines the type of plant required for the manufacture of two-burner gas plates. These units fortunately require relatively inexpensive equipment so that the total capital required is quite modest. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 881/0 PC A03/MF A01
Armstrong Cork Co., Lancaster, PA.
General Operating Rules for Power Boilers
R. G. Wickat. 23 Mar 50, 32p ICA-TB-17
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Keywords: *Boilers, Instructions, Manuals, Developing country application.

The manual is one of a series of training manuals. The suggested Rules 'Case of Power Boilers' promulgated by the American Society of Mechanical Engineers, the American Boiler Manufacturers Association, and various Political Sub-Division Authorities have been used as a guide in the preparation of these General Rules.

PB-292 887/7 PC A04/MF A01
Loughborough Univ. of Technology (England). WEDC Group.
Indexed Bibliography of Publications on Water and Waste Engineering for Developing Countries
John Pickford. Jun 77, 56p

Keywords: Water supply, Sewage disposal, Solid waste disposal, Developing countries, Bibliographies, Ground water, Irrigation, Hydrology, Lagoons(Ponds), Water treatment, Rural areas, Water consumption, Tropical regions, Industrial wastes, Sewage treatment, Cost analysis, Pumping, Septic tanks, *Hydrology, *Waste disposal, *Water resources, Developing country application, Land application, Sewage irrigation.

This bibliography is primarily intended for those working in developing countries or preparing projects for developing countries. The term 'water engineering' includes water resources and hydrology with an emphasis on community water supply. 'Waste engineering' includes solid waste as well as wastewater. Included are some references to irrigation and environmental aspects of hydro-electric schemes. There are also a few entries dealing with environmental control such as air pollution and ventilation of buildings.

PB-292 898/4 PC A05/MF A01
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.
A Sourcebook on Radio's Role in Development
Peter Spain, Judith Yarborough, and Emily Raskin. 1976, 91p Rept no. IB-7

Keywords: Radio communication, Bibliographies, Research, Research projects, Management planning, Strategy, Technology innovation, *Education, Developing country application.

A worldwide renaissance of interest in radio is underway. In this document the attempt has been made to supply as much information as possible on information sources. There are six hundred entries, the majority of which have been annotated, and some have been abstracted. The booklet is divided into three areas which include the type of document, issues, and strategies.

PB-292 899/2 PC A02/MF A01
Sears, Roebuck and Co., Philadelphia, PA.
Como Instalar un Sistema Domestico de Eliminacion de Aguas Negras. (How to Install Homart Domestic Sewage System - How to do it Yourself for Better Living)
1965, 15p
Text in Spanish.

Keywords: *Sewage disposal, *Septic tanks, Developing countries, Manuals, Diagrams, Construction materials, Installing, Pipes(Tubes), Pipe fittings, Climate, Planning, Site surveys, Area, Fluid infiltration, Developing country application.

A complete, step by step set of instructions, plans, diagrams and bill of materials needed for the installation of the Homart Domestic Sewage System are discussed. Some of the topics discussed in the report are: Climate and location considerations; line elevation; dry well construction; guides to determine adequate area for waste absorption; and pipe fittings.

PB-292 904/0 PC A04/MF A01
Academy for Educational Development, Washington, DC. Clearinghouse on Development Communication.
Tele-Niger: Adapting an Electronic Medium to a Rural African Context
Theresa Silverman. Oct 76, 53p Rept no. IB-8

Keywords: Television systems, *Education, Rural areas, *Niger, Telecommunication, Government policies, Sociology, Technology assessment, Learning, Evaluation, Mass media, Problem solving, Developing countries, *Television, Educational television, Developing country application, Instructional aids, Curriculum, Political socialization.

The report should have some relevance to current rural development projects applying a range of media to a range of problems. Some important lessons have been learned from Tele-Niger and are discussed in the report. They include a model for evaluation, positive results, and limitations.

PB-292 908-SET PC E11
ACTION/Peace Corps, Washington, DC.
Small Farm Grain Storage
Sep 76, 547p-in 3v

Keywords: *Food storage, *Grains(Food).

See reports PB292909, PB292910, PB292911.

PB-292 909/9 PC A10/MF A01
ACTION/Peace Corps, Washington, DC.
Small Farm Grain Storage. Volume I. Preparing Grain for Storage
Program and training journal manual series
Carl Lindblad, and Laurel Druben. Sep 76, 209p Rept no. MANUAL SER-2-VOL-1
Also pub. as VITA Publications manual series no. 35E. Also available in set of 3 reports PC E11, PB-292 908-SET.

Keywords: *Grains(Food), Farm storage, Developing countries, Manuals, Drying, Moisture content, Temperature, Insects, Rodents, Fungi, Cleaning, Design, Construction, Harvesting, Heating, *Food storage, Developing country application, Granaries, Appropriate technology.

This brochure discusses grain storage problems as they are faced by small-scale farmers. It contains explanations of the structure of grain, the relationship between grain and moisture, the need for proper drying. One large section contains detailed, fully illustrated plans for constructing a variety of small-scale grain dryers.

PB-292 910/7 PC A09/MF A01
ACTION/Peace Corps, Washington, DC.
Small Farm Grain Storage. Volume II. Enemies of Stored Grain
Program and training journal manual series
Carl Lindblad, and Laurel Druben. Sep 76, 180p Rept no. MANUAL SER-2-VOL-2
Also pub. as VITA Publications manual series no. 35E. Also available in set of 3 reports PC E11, PB-292 908.

Keywords: *Pest control, *Grains(Food), Farm storage, Developing countries, Manuals, Insects, Rodents, Life cycles, Coleoptera, Lepidoptera, Malathion, Poisons, Traps, Insecticides, Dosage, Safety, *Food storage, Developing country application, Appropriate technology.

This is an in-depth study of two major enemies: insects and rodents. Each is discussed in detail with guidelines for (1) defining the size of the problem and (2) protecting grain by both chemical and non-chemical means. This volume includes dose and use information for a variety of pesticides, as well as suggestions for preparing materials to be used in audio-visual presentations.

PB-292 911/5 PC A08/MF A01
ACTION/Peace Corps, Washington, DC.
Small Farm Grain Storage. Volume III. Storage Methods
Program and training journal manual series
Carl Lindblad, and Laurel Druben. Sep 76, 158p Rept no. MANUAL SER-2-VOL-3
Also available in set of 3 reports PC E11, PB-292 908-SET.

Keywords: *Grains(Food), Farm storage, Developing countries, Manuals, Baskets, Bins, Silos, Underground structures, Construction, Construction materials, Insecticides, Maintenance, Cleaning, Containers, *Food storage, Developing country application, Granaries, Appropriate technology.

This brochure contains a survey of storage facilities from the most traditional basket-type granary to metal bins and cement silos. The emphasis in this volume is on improving existing facilities; for example, there are detailed construction procedures for an improved mud silo. Storage in underground pits and sacks also is discussed. There are guidelines for using insecticides in storage situations. The largest silo presented in detail is the 4.5 ton cement stave silo.

PB-292 913/1 PC A02/MF A01
Asian Inst. of Tech., Bangkok (Thailand).
Solar Rice /Dryer
Robert H. B. Exell, and Sommai Kornsakoo. Oct 78, 9p
Sponsored in part by John F. Kennedy Foundation of Thailand, Bangkok.

Keywords: Solar heating, *Rice, Drying apparatus, Solar energy, Descriptions, *Thailand, Technology innovation, Instructions, Photographs, Agricultural machinery, Crop driers, *Solar drying, Solar rice dryers, Developing country application.

The paper briefly describes a low-cost solar heated rice dryer which is protected from the rain and can dry paddy in one or two days. Photographs and illustrations are used to help understand and implement the directions for constructing a solar rice dryer.

PB-292 915/6 PC A05/MF A01
Agency for International Development, Washington, DC. Office of Agriculture.
The Development of Hybrid Corn Technology in the United States and Selected Countries
Technical series bulletin
G. F. Sprague. Mar 75, 91p Rept no. TSB-16

Keywords: Hybridization, Corn plants, Plant genetics, History, Yield, Selection, Corn oil, Proteins, Insects, Vulnerability, Plant diseases, Marketing, Economic development, Seeds, United States, Europe, Kenya, Colombia, Brazil, Southeast Asia, India, *Crops, Developing country application.

The report presents the background and recent developments of the new high-yielding more nutritive corn types and explains their significance in food-short countries among malnourished populations. This new high lysine corn out-yields native corn types and has more than double the nutritive value of ordinary corn with protein quality essentially equal to that of skim milk. Worldwide development and acceptance have been relatively rapid. Unlike ordinary corn, these new types are not deficient in two essential amino acids--lysine and trytophan.

PB-292 919/8 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Hooked Rugs
Oct 61, 30p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Carpets, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a Hooked Rug plant in a foreign country. This industry is peculiarly adapted to locations where wage rates are low since only $260 for machinery and equipment is required and only sixteen workers, direct and indirect, are used. It can be operated as a domestic, home, handicraft employing only the members of a family or as a small industry as shown in the report. The annual capacity of this plant is 1,200 rugs, 36 inches by 56 inches or 14 square feet in size. The annual sales value would remain about the same regardless of the size of the rugs, since smaller rugs would sell for proportionately more per square foot and larger rugs would sell for proportionately less per square foot. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 920/6 PC A03/MF A01
Wolf Management Engineering Co., Chicago, IL.
Plant Requirements for Manufacture of Wire Products
Sep 57, 43p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Wire, Requirements, Production management, Production methods, Production capacity, Operating costs, Wire drawing, Materials estimates, Equipment, Machinery, Industrial management, Production planning, Cost estimates, Staples, Nails(Fasteners), Fences, Barbed wire, Developing country application.

The report concerns the cost and economic feasibility of establishing a wire products factory. It is one of a series resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions. The following topics are discussed: Machinery and equipment for producing wire; Estimated cost of machinery and equipment for producing wire; Machinery and equipment for producing fencing wire; Machinery and equipment for producing wire garment hangers; Machinery and equipment for producing fly screen; Machinery and equipment for producing nails and staples; Economics of a wire mill and fence making operation; and Technical assistance 'turn-key' operation.

PB-292 921/4 PC A04/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Radios
Sep 57, 63p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Radio receivers, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The small radio manufacturing plant described in the report is designed to produce radio receiving sets where the demand for this product exists and where such a local operation would be practicable. It has several particular characteristics of special merit in connection with programs for economic development. The most important advantages briefly stated are as follows: Small investment of fixed capital; range of choice as to volume of operation to be undertaken; the rapidity with which the project may be changed; the ease with which operations may be expanded in many different directions; the speed with which unskilled workers can become proficient even though they do not have a technical education; the social and cultural value of the product, which should lead to its wide distribution; the ease with which such a product can be maintained; and the high proportion of production cost which goes to employment of local people. The report was pre-

pared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 922/2 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Boxes and Shooks
Dec 57, 49p

Keywords: *Industrial plants, Manufacturing, Boxes(Containers), *Wood products, Assembling, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Containers, Developing country application.

The small box and shook plant described in the report is intended to manufacture wooden boxes and shooks where the demand for these products exists and where such a local operation would be practicable. The machinery and equipment recommended is adequate to manufacture any design or size of wooden box or shook. A shook is a knocked down box. It includes all the wood pieces to make a box, bundled together complete, ready for assembling and nailing. The end pieces in a shook are usually assembled, and nailed, if they consist of more than one piece. Boxes are usually ordered in the form of shooks where they are shipped long distances before being used. Shipment as shooks saves a great deal of shipping space, which, in turn, reduces the cost of freight, and saves warehouse space at the point of use. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 923/0 PC A02/MF A01
Wolf Management Engineering Co., Chicago, IL.
Plant Requirements for Manufacture of Carob Molasses
Sep 57, 24p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Requirements, Production methods, Production capacity, Operating costs, Fruits, Materials estimates, Equipment, Plant layout, Cost estimates, Labor estimates, Developing country application, *Molasses, Carob.

The report outlines a modern plant of modest capacity which would most likely be applicable to the average economic location where carob is grown and harvested on a limited commercial basis. It is assumed that the basic production is carob molasses or syrup with sugars or sucrose still remaining in the raw liquid. The processing of gums from the seeds and other products from the residual pulps is not considered and would require specific reports, particularly if the refined sugars, gums and residual usable pulp are to be considered end products. The report is based on a daily processing capacity of 21,875 lbs. of unhulled pods. This would accommodate the average annual yield of 8,750 lbs. per acre from 300 acres, with the mill operating on the basis of 120 days per year, 24 hours per day. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 936/2 PC A03/MF A01
Hesperian Foundation, London (England).
Health Care and Human Dignity - A Subjective Look at Community-based Rural Health Programs in Latin America
Sep 76, 27p
Sponsored in part by National Fund for Research into Crippling Diseases, London (England). Paper presented at Symposium on Appropriate Technology and Delivery of Health and Welfare Services for the Disabled in Developing Countries, Held at Oxford, England on September 26-30, 1976.

Keywords: *Latin America, Rural areas, Communities, Rural health services, Health care, Developing country application, Health programs, *Health care delivery, Foreign countries, Primary health care, Health planning.

The paper is an interesting and practical look at health care programs in rural communities. It explores ways in which existing health programs help either to cripple communities or to make them whole. Steps are briefly explored which are being taken or could be taken to implement a regional or national approach to rural health care that is community supportive.

PB-292 937/0 PC A18/MF A01
Ministerio de Planificacion y Politica Economica, Panama City (Panama). Dept. de Politica Cientifica y Tecnologica.
Estudios Sobre Politica Cientifica y Tecnologica de Panama (Studies on the Scientific and Technological Policy in Panama)
Oct 77, 407p
Text in Spanish.

Keywords: *Technology transfer, Industries, *Panama, Research, Inventions, Patents, Capital, Investments, Developing countries, Food industry, Problem solving, Law(Jurisprudence), International relations, Government policies, *Science policy, *Industrial development, Industrial technology, *Research and development, Trademark registration, Trademarks, Information needs, Scientific research, Developing country application.

In broad terms, all papers deal with technology transfer in terms of industrial property, inventions, patents, technical know-how, scientific and technological needs analyses, the R&D system, and science policy in Panama. Possible problem areas are identified which may result from laws (on patent infringements, novelty of industrial designs and models, commercial trademarks) which a developing country must promulgate to allow free access to, and technology transfer of, scientific and technical information. Rights of third parties are discussed in relation to trademarks which cannot be registered. For example, the well known trademark of a food product should not be used to identify a pesticide. The relationship between multinational capital investment and the foodstuffs industry is outlined. Priority items in the national development plan are mentioned. A study of general lines of generation, dissemination and integration of science policy in Panama is presented as part of the overall effort toward the identification and solution of problems; this will lead to greater development of domestic science and technology in various sectors (tourism, agriculture, fishing, and health).

PB-292 938/8 PC A04/MF A01
Instituto de Investigacion Tecnologica Industrial y do Normas Tecnicas, Lima (Peru).
Efecto del Proceso de Importacion de Tecnologia en el Peru (Periodo 1971/74) (Effect of the Process of Technology Importation into Peru (1971-1974 period)
1974, 75p Rept no. POLITICA TECNOLOGICA-5
Text in Spanish.

Keywords: *Technology transfer, *Peru, Methodology, Surveys, Personnel development, Evaluation, Statistical data, Patents, Licenses, Cost engineering, Profits, International trade, Imports, Contracts, Balance of payments, *Industrial development, Industrial technology, Trademarks, Monopoly, Developing country application.

The methodology used to evaluate technology transfer by importation into Peru is outlined. Methodological methods included data collection, personnel training, analysis, and evaluation of results. Research centered upon reducing costs to the country receiving the technology, upon preventing excess profits, and upon restrictive clauses (listed in the document annex). Statistics are presented on the specific nature of the technology to be transferred, by industry, by country of origin, and by the effect on the domestic industry. Concrete costs in relation to their effect on balance of payments and on monetary benefits to Peru are outlined; stronger monetary controls are recommended. A legal analysis of restrictions on technology transfer of 404 existing technology contracts is provided. It is noted that these contracts are the legal instruments by which monopolies are engendered and proliferate. In this connection, it is significant that only 10% of the patents registered in Peru are of national origin. This factor, together with the increasing trademark licensing, accounts for growing technological dependence. Based on this study Peru followed Decision 24 of the Andean Group, which deals with patents and trademarks. Statistics discriminate number of contracts and restrictive clauses by geographical world regions. Although indigenous industries (iron, copper mining, fishing) have been developing, it is noted, in the struggle to consolidate and win new markets, advanced technology is required to decrease costs.

PB-292 943/8 PC A04/MF A01
Armstrong Cork Co., Lancaster, PA.
Power Plant Training Course - Steam Accessories
Technical bulletin.
Mar 61, 54p ICA-TB-16
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Keywords: Education, Control equipment, *Boilers, Instrumentation, Steam traps, Separators, Flow regulators, Accessories, *Training, Developing country application.

This presentation on Steam Accessories was developed to help train employees to understand facts of importance about accessories. To avoid confusion, no attempt has been made to cover all the accessories of all manufacturers. The information given here does include A.S.M.E. types --- a knowledge of which will help anyone understand accessories of the same types.

PB-292 944/6 PC A02/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Problems in Business Management: Management Training
Technical bulletin.
Jun 62, 22p Rept no. TB-30

Keywords: *Management training, Personnel management, Organization theory, Meetings, Job analysis, Industrial relations, Human factors engineering, Production control, Cost effectiveness, Leadership, Supervision, Executive ability, Communicating, Instructional materials, Responsibility, Administrative problems, Developing country application.

Good results can often be obtained with a minimum of expense, providing that each head of a department plays his part. The results can be measured as follows: In terms of decrease in the problems which the head of the department encounters which, in turn, gives him: - More time for planning improvements, less disorder, less confusion, fewer accidents, better morale. In terms of economy, some direct results are: less time to train new employees, fewer broken tools, less defective work, increased production.

PB-292 945/3 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Problems in Business Management - Market Development
Technical bulletin.
1962, 44p Rept no. TB-34

Keywords: *Marketing, Economic factors, Education, Management training, Planning, Production control, Finance, Sales, Market research, Industrial relations, Organization theory, Public relations, Records management, Instructional materials, *Management tech-

niques, Business education, Administrative personnel, Developing country application.

Planning and control of production as well as of costs depend to a large extent upon anticipated sales. The brochure discusses marketing in all its various aspects. Selling is imperative to any business, and for this reason it takes into consideration the psychological aspect in order to know the attitude required by business management. The three essential functions of any management which are basic for its business are: To finance, to produce, and to sell. Only through sales can a business progress; therefore, can a management ignore the world around it and produce only for the pleasure of it.

PB-292 946/1 PC A03/MF A01
Johnson and Johnson, New Brunswick, NJ.
Conference Leadership Training
Training manual
Oct 56, rep AID/TM-21

Keywords: *Management training, Leadership, Meetings, Supervision, Personnel management, Industrial training, Supervisors, Industrial relations, Group dynamics, Planning, Educational sociology, Social communication, *Training, Training techniques, Conferences, Supervisory training, Discussion groups, Developing country application.

The manual includes steps in leading a conference, techniques for controlling and guiding a conference, techniques of the approach, practice conferences, types of conferences, preparing and planning the conference, responsibilities of conferees and summary of conference leadership techniques.

PB-292 950/3 PC A05/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Programme de Vivres pour la Paix: L'Alimentation des Populations (Food for Peace Around the World)
1963, 97p
Text in French.

Keywords: Food dispensing, *Food services, Food preparation, Kitchen equipment and supplies, Schools, Communities, Developing countries, Villages, Developing country application, School lunch program.

The publication suggests ways of setting up or improving simple and inexpensive feeding centers, ways of using local food, and ways of preparing and serving the food. The material may be helpful to all who are working to improve health and well-being through community feeding centers and school lunch programs.

PB-292 953/7 PC A04/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Economics Training - Charts
Technical bulletin
Apr 61, 70p Rept no. TB-40

Keywords: Economics, *Education, Visual aids, Charts, Photographs, Training devices, Prices, Supply(Economics), Demand(Economics), Competition, Salaries, Productivity, Government, Cost analysis, Economic conditions, *Training, Money systems, Expenditures, Developing country application.

The pamphlet contains charts and visual aids normally used in connection with the economic training program in Technical Bulletin No. 22 entitled 'Economics Training'.

PB-292 955/2 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to Set Up and Operate a Phosphate Processing Plant
May 59, 39p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Chemical industry, *Industrial plants, Manufacturing, Inorganic phosphates, Requirements, Production management, Production methods, Production capacity, Operating costs, *Fertilizers, Calcium phosphates, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Process charting, *Phosphates, Developing country application.

Practically all fertilizers used in the United States are prepared on a super-phosphate base. This material is used alone in large tonnages and almost invariably is the component present in large quantities in mixed fertilizer. Since the manufacture of superphosphate consumes much sulphuric acid, the making of this important fertilizer material is often associated with the making of sulphuric acid. In fact, economic considerations are making it necessary that the large scale superphosphate maker be also a sulphuric acid manufacturer. Successful manufacture of either sulphuric acid or superphosphate is today necessarily a large-scale business. The small manufacturer of these commodities usually is at a great economic disadvantage. The capital required for materials handling and skilled supervision for both superintendence and general management place disproportionately great burdens on any plant of small output. This manual describes a plant which is of adequate size and also capable of considerably increased output without proportionate capital expenditures. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 956/0 PC A02/MF A01
Suburban Research Corp., Gaithersburg, MD.
Plant Requirements for Manufacture of Aluminum Architectural Specialties
Sep 57, 15p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Aluminum, Doors, Windows, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal shapes, Metal sheets, Materials estimates, Equipment, Plant layout, Production planning, Cost estimates, Labor estimates, *Building materials, Developing country application.

The report presents information on total investment involved, machinery required, and manufacturing costs for establishing and operating a small plant to produce the following aluminum articles for the construction trade: sliding doors, louver type windows, windows of various types, aluminum frames for picture glass doors, show cases for stores, doors for showers, and gutters and down spouts (also in copper). The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 957/8 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements to set up and Operate Small Steel Rolling Mill
Feb 58, 46p

Keywords: *Industrial plants, Steel plants, Manufacturing, Hot rolling, Bars, *Metal shapes, Requirements, Reinforcing steels, Production management, Production methods, Production capacity, Operating costs, Billets, Materials estimates, Equipment, Plant layout, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Steel industry, Developing country application.

The small steel rolling mill described in this brochure is intended to manufacture hot rolled reinforcing bars and merchant shapes from billets or ingots where the demand for such products exists and where such a local operation would be practicable. Either billets or ingots will be adaptable for use as the raw material in this mill. However, for the purpose of simplification, only billets are discussed. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 958/6 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Jute Yarn
Oct 61, 33p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Yarns, Carding, Spinning(Staple fibers), Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Textile processes, Developing country application, *Jute.

The purpose of the report is to present basic information for establishing a manufacturing plant, in a foreign country, to produce jute yarn. Some of the uses of this product are the following: rug backing, twine, feed bags, furniture webbing, auto upholstery supports, electric cable covering, sugar bags, fertilizer bags, cotton bale covering, linoleum backing, reinforced paper, rope, knit tubing, hooked rugs and embroidery, women's skirts, brattice cloth (mine ventilating), nursery burlap, and rug pad centers. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 959/4 PC A03/MF A01
Middle West Service Co., Chicago, IL.
Plant Requirements for Manufacture of Brass Table Lamps
Sep 61, 36p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Lamps, Brasses, Assembling, Finishing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, *Brass, Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce approximately 4,000 brass lamps per month. Many types of brass lamps are manufactured in the United States each year, and each type is produced in a vast number of sizes and designs. Thus labor and material costs will vary according to the type, size, and design, in addition to the quality of the lamp produced. Furthermore, it has become a very prevalent practice in the United States for brass lamp manufacturers to buy the component parts of a lamp from other companies, such as white metal casting companies, metal stamping, spinning, and electroplating companies, and lamp shade manufacturers. This results in the lamp manufacturer's activities being confined to finishing and assembling, which is the type of plant described in this report. Separate, specialized operations such as this represent a very economical method for producing brass lamps. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing

and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 960/2 PC A03/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements to Set Up and Operate a Copper Wire Drawing and Insulating Plant
Jan 62, 39p

Keywords: *Industrial plants, *Wire, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Bare wire, Insulated wire, Extruders, Developing country application.

The purpose of the report is to present basic information relative to the establishment of a copper wire drawing and insulating facility in a foreign country. This plant will be equipped to produce both bare and insulated copper wire from copper rods. Future production might be diversified to include tinned and enameled wires, an increased range of wire sizes, and the manufacture of twisted insulated wires or small cables. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-292 964/4 PC A03/MF A01
Johnson and Johnson, New Brunswick, NJ.
Management Development Programs for Executives and Supervisors and a Manufacturing Division
Technical bulletin
Oct 56, 37p ICA/TB-24

Keywords: *Management training, Manufacturing, Executives, Supervisors, Personnel development, Supervision, Leadership, Executive ability, Industrial relations, Social communication, Personnel management, Performance evaluation, *Training, Supervisory training, Training techniques, Developing country application, Skill development, Administrative principles.

The manual provides information on supervisory training, human relations skills, administrative skills, technical skills, training tools, and techniques, and requirement and functions of executive development.

PB-292 965/1 PC A03/MF A01
General Mills, Inc., Minneapolis, MN.
Maintenance Training Program
Technical bulletin.
Dec 56, 39p ICA/TB-26

Keywords: Maintenance, Specialized training, Personnel development, Guidelines, Objectives, Performance tests, Requirements, Qualifications, Abilities, Employment, *Training, Developing country application.

The manual is an administrative guide for conducting maintenance training procedures. It provides a description of the procedures involved, and the responsibilities assigned in the operation of a Maintenance Training program. A Maintenance Training Program is a coordinated program of on-the-job training and experience. Its over-all objectives are to develop and assist maintenance personnel to qualify for higher classifications, subject to operating requirements. Measurement of the degree of readiness is determined through the administration of the Maintenance 3rd Class and Maintenance 1st Class tests. The basic elements of the training procedure are as follows: (1) A progress appraisal form; (2) General description of areas of knowledge and ability necessary to qualify for Maintenance 1st Class rating; (3) A perpetual skill and training inventory; and (4) A list of approved related training courses available to local plant personnel.

PB-292 976/8 PC A08/MF A01
Institute of Medicine, Washington, DC.
Health in Egypt: Recommendations for U.S. Assistance
Final rept.
Jan 79, 158p Rept no. IOM-79-01
Contract AID/NE-C-1476

Keywords: *Egypt, Population growth, Africa, Recommendations, Nutrition, Programs, Criteria, Drugs, Emergency medical services, Research, Technical assistance, National government, Demography, Socioeconomic factors, Infectious diseases, Public health, *Health care delivery, Developing countries, Agency for International Development, Foreign countries, Hospital administration, Health care, Health status, Health resources, Family planning.

The report sets out criteria for future AID health, population, and nutrition programs, recommends some general program areas, pinpoints some specific problems in these areas, and suggests ways in which the administration of the U.S. program in Egypt might be strengthened. AID support, the report says, should go to sustained efforts to reduce infant, pre-school child, and maternal mortality; a program to improve production and distribution of vaccines and pharmaceuticals needed for the first-mentioned effort; establishment of nationwide emergency medical services; strengthening hospital administration; a cooperative research program for health, family planning, and nutrition. Report also contains five chapters of background information on Egyptian economic, demographic, and social factors; health problems; health resources; population and family planning; and nutrition.

PB-292 983/4 PC A04/MF A01
Johnson and Johnson, New Brunswick, NJ.
Communications in Business and Industry
Technical Bulletin.
Oct 56, 53p ICA-TB-20

Keywords: *Management techniques, Social communication, Communicating, Personnel management, Communications management, Policies, Cooperation, Motivation, Morale, Attitudes, Industrial relations, Public relations, Opinions, Psychological effects, Supervisors, Employees, Developing country application.

The report contains information on developing effective downward communications, steps in the program for reviewing and improving communications, conference outline on communications down, communications devices used in Johnson & Johnson, psychology of change, guiding rules for communications, check list of commonly used devices and evaluation of meetings on communications.

PB-292 984/2 PC A03/MF A01
Agency for International Development, Washington, DC. Communications Resources Div.
Problems in Business Management, Production Planning
Jun 62, 38p Rept no. TECHNICAL BULL-33

Keywords: Production planning, Production control, Productivity, Scheduling, Capacity, Resource allocation, Personnel management, Supervision, Prices, Cost engineering, Purchasing, Supply management, Industrial relations, Problem solving, Meetings, *Management training, Manufacturing, Business administration, Training techniques, Developing country application.

The pamphlet contains a business management training course on the subject of production planning and control. The information is particularly useful to developing countries.

PB-292 990/9 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Problems in Business Management. Nature and Scope of Management Responsibilities
Technical bulletin.
Jun 62, 34p Rept no. TB-27

Keywords: *Management training, Job analysis, Personnel development, Industrial relations, Organization theory, Production control, Sales, Financing, Coordination, Market research, Leadership, Executive ability, Meetings, Responsibility, Developing country application.

The purpose was to present information and stimulate interest in the principles of techniques of modern management. The objectives cite: the employer's duties; the personality of the enterprise director: Organization of the enterprise; personnel training, human relations, production, sales, and financing.

PB-293 000/6 PC A02/MF A01
Aries Associates, Inc., Stamford, CT.
Plant Requirements for Manufacture of Brewers Flakes
Mar 60, 25p
Prepared in cooperation with Robins (A. K.) and Co., Inc., New York. Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Food products, Manufacturing, Requirements, Production methods, Production capacity, Operating costs, Grains(Food), Materials estimates, Equipment, Plant layout, Machinery, Production planning, Cost estimates, Labor estimates, Beer, Developing country application, *Brewers flakes.

The report outlines a small plant for the production of Brewer's Flakes of 4 tons per day capacity. The report is one of a series of reports resulting from overseas inquiries on factory operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 001/4 PC A03/MF A01
Lederer (A. M.) and Co., New York.
Plant Requirements for Manufacture of Flexible Steel Conduit
Feb 57, 36p
Prepared in cooperation with Sleeper and Hartley, Inc., Worcester, MA., and Waterbury Farrel Foundry and Machine Co., CT. Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Pipes(Tubes), Flexible structures, Steels, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Conduits.

The report outlines the type of plant required for the manufacture of flexible steel conduit. This plant is also capable of manufacturing many similar products with the same equipment, such as flexible tubing and exhaust hose. With the addition of some relatively inexpensive equipment, the plant can manufacture moisture-proof conduit and tube, armored cables, parkway cables, and similar armored products. In addition to steel, other metals such as aluminum, brass, and bronze may be used to make conduit, tubing, and armored cable. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 002/2 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Animal Feed Pellets
May 59, 43p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Feed pellets, Manufacturing, Feeding stuffs, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, In-

dustrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report outlines the type of plant required for the manufacture of animal feed pellets. The use of scientifically balanced diets is a widely recognized necessity for obtaining best results in the raising of animals and poultry. The diets vary with the type of animal, its age, and the purpose for raising it. In addition, the knowledge gained through research results in continuous changes in the recommended diets. Formulas for each of several applications are included in the report. They are representative of an infinite number of possible formulas for each of the conditions. The food available in each locality should be substituted in these formulas to keep the cost at a minimum. This can be done while maintaining quality. The tables of costs include a blank column where the local costs of all the items can be entered. The capacity of the plant is approximately 2 tons per hour, or 50 tons in 24 hours, based on the capacity of the pellet machine. The annual production is estimated at 12,500 tons. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 003/0 PC A03/MF A01
Snell (Foster D.), Inc., New York.
Plant Requirements for Manufacture of Castor Oil
Aug 59, 26p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Vegetable oils, Manufacturing, Castor oil, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The report covers the procedures, plant equipment, and economics involved in the processing of 5,000 tons per year of castor beans to castor oil and oil derivatives. The report is one of a series of reports resulting from overseas technical inquiries on factory operation, management and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 004/8 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Woolen Yarn
Sep 61, 31p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Yarns, Manufacturing, Woolen spun yarns, Carding, Spinning(Staple fibers), Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The plant described in the report is intended to manufacture woolen yarn. Compared with the yarn industry in the United States this is a small plant. However the machinery and equipment listed is capable of producing woolen yarn on a competitive basis in a foreign country. The annual capacity of this plant is about 400,000 pounds or 200 tons. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 005/5 PC A02/MF A01
Methods Engineering Council, Pittsburgh, PA.
Plant Requirements for Manufacture of Shell Buttons
Jul 55, 22p
Sponsored in part by International Cooperation Administration, Washington, DC.

Keywords: *Industrial plants, *Clothing, Manufacturing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Production planning, Cost estimates, Labor estimates, Developing country application, *Buttons, Shells.

The purpose of the report is to present basic information for establishing and operating a plant to manufacture shell buttons in a country with a tropical or semi-tropical climate. The information includes general manufacturing methods, plant layout, and costs of materials, equipment, and labor based on the assumptions contained in this report. The plant described is considered to be the economic minimum in size which utilizes suitable equipment and methods. Products are to be simple and varieties limited in order that costs may be kept to a minimum. As an essential preliminary, potential plant operators must determine whether or not there is a market for the products of this plant. Naturally, they must be willing to assume the risks inherent in any business. The profits shown in the profit and loss statement are illustrative and depend upon market conditions, good management, and local factors.

PB-293 006/3 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Rice Bran Oil
Sep 61, 44p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Vegetables, Manufacturing, *Rice, Oils, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Rice bran, Bran.

The purpose of the report is to present basic information for establishing a rice bran oil plant in a foreign country. The annual production of the plant is 4,000 tons of Rice bran oil, and 22,000 tons of Bran meal. The report was prepared to answer overseas technical inquiries on factory operation, management and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 007/1 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Raw Sugar
May 59, 36p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Sugar, Manufacturing, Sugar crops, Requirements, Production management, Production methods, Production capacity, Operating costs, Sugarcane, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, Raw sugar.

The sugar plant described in the report is to manufacture raw sugar from sugar cane. Production of cane varies with many conditions such as soil, temperature, water, and climate; and yield amounts to from 40 to 75 tons per acre. The plant herein described requires an input of 600 tons of cane per day for its economical operation and the harvesting campaign usually lasts about five months. It is therefore assumed that it will draw its raw materials from an area about 2,000 acres under cultivation.The output of this plant will amount to approximately 60 tons of raw sugar per day. Raw sugar is produced near the cane growing areas by mills usually called 'centrals.' The raw sugar from several centrals is then shipped, often long distances and usually overseas, to great refineries at the seaports of more densely populated areas where the consumption is high. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 008/9 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Pharmaceutical Glass
Sep 57, 38p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, *Glass, Medical equipment, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The small pharmaceutical glass plant described in the report is intended to manufacture glass tubing, ampoules and vials for antibiotics. Other pharmaceutical products such as syringes and glass for laboratory uses can be produced in this plant. The glass tubing ampoules and vials will be of neutral glass. The ampoules and vials shall have a capacity of from five to eight cubic centimeters. Other sizes and other products may be produced in this plant but for the purpose of the report only the above products will be considered. The annual capacity of this plant is about seven tons of glass per day which will produce ten million ampoules and fifteen million vials per year having a capacity of from five to eight cubic centimeters and provide some additional tubing for other products. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 009/7 PC A02/MF A01
Office of Technical Services, Washington, DC.
Plant Requirements for Manufacture of Fish Meal
Feb 56, 14p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, *Food products, Manufacturing, *Fish protein concentrates, Fishes, Requirements, Production methods, Production capacity, Equipment, Plant layout, Developing country application.

The report outlines the type of plant required for the manufacture of fish meal. Such a plant is to process about five tons of raw material, fish and fish waste, per eight hours. The report is one of a series of reports resulting from overseas technical inquiries on factory

operation, management, and engineering. The report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. Plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 010/5 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Lead Pencils
Oct 61, 37p
Sponsored in part by International Cooperation Administration, Washington, DC. Technical Aids Branch.

Keywords: *Industrial plants, Manufacturing, Requirements, Production management, Production methods, Production capacity, Operating costs, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application, *Pencils.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce lead pencils with a capacity of 500 gross of pencils per day. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 011/3 PC A03/MF A01
Andrews (George H.) Engineering Associates, Inc., Washington, DC.
Plant Requirements for Manufacture of Aluminum Kitchenware
Jan 62, 33p

Keywords: *Industrial plants, Manufacturing, *Kitchen equipment and supplies, *Aluminum, Requirements, Production management, Production methods, Production capacity, Operating costs, Metal sheets, Materials estimates, Equipment, Plant layout, Machinery, Financial management, Industrial management, Production planning, Cost estimates, Labor estimates, Developing country application.

The purpose of the report is to present basic information for establishing a manufacturing plant in a foreign country to produce aluminum kitchenware from aluminum sheets. There are many kitchen utensils which can be made from aluminum. These include roasting pans, cake pans, muffin pans, biscuit and cookie baking sheets, casseroles, can openers, knives, forks, spoons, molds, juice extractors. The type particularly suitable for manufacture from aluminum includes kettles, double boilers, waterless cookers, and saucepans. A saucepan has been taken as representative of this group and the estimates in this report are based on the manufacture of such a representative piece. The report was prepared to answer overseas technical inquiries on factory operation, management, and engineering. It includes brief information and cost estimates on labor, machinery, equipment and supplies, as well as information relative to engineering, training, safety, markets, sales, financial and economic factors. However, the report is designed to provide only a general picture of the factors that must be considered in establishing and operating a factory of this type. In most cases, plans for actual installations will require expert engineering and financial advice in order to meet specific local conditions.

PB-293 036/0 PC A15/MF A01
Stanford Univ., CA. Graduate School of Business.
Plant Size, Location and Time-Phasing
Alan S. Manne. Mar 66, 341p
Prepared in cooperation with Indian Statistical Inst., Calcutta, and Massachusetts Inst. of Tech., Cambridge. Center for International Studies. Sponsored in part by Ford Foundation, New York.

Keywords: *Site selection, *Management techniques, Plant location, Time measurement, Size determination, Investments, Financial management, Planning, Manufacturing, Industries, Sodium hydroxide, Cements, Aluminum, Fertilizers, Supply(Economics), Demand(Economics), Materials estimates, Operating costs, Cost engineering, Production engineering, India, Organization size(Groups), Case studies, Economics of scale, Developing country application, Capital, Economic analysis, Dynamic programming.

The volume is concerned with planning investments in a series of future manufacturing facilities. Case studies are reported for four heavy process industries in India: aluminum, caustic soda, cement, and nitrogenous fertilizers. In these sectors, there are significant economies-of-scale in manufacturing, and there is a close interdependence between the size, location and time-phasing of new capacity. Problems of investment planning have both a theoretical and a practical side. They are of common interest to managers, engineers, operations researchers, and economists. In preliminary presentations of this material, the author has observed that the type of question raised depends heavily upon the individual's professional background. The manager or engineer is usually concerned with the practical relevance, the realism and the transferability of these studies; the operations researcher tends to concentrate on the algorithmic and the uncertainty aspects; and the economist focuses upon the implications for development planning.

PB-293 105/3 PC A06/MF A01
Illinois Inst. of Natural Resources, Springfield. Div. of Alternative Energy.
Illinois Appropriate Technology Project Book
Jill Kunka. 8 Nov 78, 103p Rept no. ILLDOE-78/10

Keywords: Directories, Buildings, Greenhouses, *Education, *Energy source development, Planning, Water conservation, Solid waste disposal, Solar energy, Wind power, Hydroelectric power generation, Biomass, Organizations, Research projects, Personnel, Financing, Guidelines, Illinois, Energy conservation, Appropriate technology, *Waste recycling, Waste oils.

The Project Book is a guide for local governments and organizations interested in developing appropriate technology projects, such as low cost solar and other alternative energy projects, community gardening projects, and water conservation projects. It includes sections on the Institute of Natural Resources and other coordinating agencies, a guide to finding funding sources, bibliographies, and summaries of over 100 ongoing Illinois projects.

PB-293 140/0 PC A16/MF A01
Jain (T. C.), New Delhi (India).
Survey of Indian Agro-Bio-Economic and Allied Literature, 1947-1975. A Bibliography. Volume 1 - Classified Part
T. C. Jain. c1978, 364p

Keywords: Social sciences, Agriculture, Bibliographies, *India, Economics, Farm crops, Farm processing, Agricultural products, Soil conservation, Irrigation, *Agricultural economics, Agricultural engineering, Agronomy, Rural areas, Social change, Community development, Political science, Public administration, Education, Mathematics, Chemistry, Oceanology, Geology, Biology, Medicine, Villages, Developing country application.

This volume is a comprehensive record of Indian publications on the subject of agriculture and agricultural sciences, social sciences, physical sciences, medicine, and economics. The 5000 entries included in the volume represent books, monographs, mimeographed studies, serials, and continuations, series publications and significant pamphlets. The classified part, which is the entirety of this volume, is designed for the subject approach and is grouped according to the universal decimal classification scheme (UDC B.S. 1000B; 1958 with expanded schedules).

PB-293 141/8 PC A99/MF A01
Jain (T. C.), New Delhi (India).
Survey of Indian Agro-Bio-Economic and Allied Literature, 1947-1975. A Bibliography. Volume 2 - Author Part, Title Part and Directory of Publishers
T. C. Jain. c1978, 640p

Keywords: Social sciences, Agriculture, Bibliographies, *India, Economics, Farm crops, Farm processing, Agricultural products, Soil conservation, Irrigation, *Agricultural economics, Agricultural engineering, Agronomy, Rural areas, Social change, Community development, Political science, Public administration, Education, Mathematics, Chemistry, Oceanology, Geology, Biology, Medicine, Villages, Developing country application.

This volume is the continuation of the comprehensive record of Indian publications. The bulk of this volume is devoted to three areas: the author part, the title part, and a directory of publishers. The author part includes appropriate cross-references to variant forms of names. The title part combines extensive cross-references to alternative forms of titles. Each entry in all three parts contains the following information: author, title, place of publication and the publisher's name, year of publication, number of pages, size, and the price.

PB-293 560/9 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Sun Dry Your Fruits and Vegetables
Helen Strow, and Evelyn Spindler. Jul 58, 30p

Keywords: *Fruits, *Vegetables, *Solar drying, Drying, Manuals, Selection, Food preparation, Solar radiation, Sulfur, Equipment, Containers, Food storage, Developing country application.

The drying of surplus food can mean more good health foods for the family in seasons when these foods are not available fresh. It can add variety to the diet and make cooking easier. Drying is not difficult and it involves very little equipment. This booklet tells you what foods can be dried and the steps for drying fruits and vegetables. It is illustrated for greater understanding.

PB-293 605/2 PC A02/MF A01
Department of Agriculture Extension Service, Washington, DC.
Seeing is Believing. How to Conduct Convincing Result Demonstrations
Helen Strow, and Amy Cowing. Jan 60, 14p
Sponsored in part by International Cooperation Administration, Washington, DC.

Keywords: Technical assistance, Developing countries, Agriculture, Communicating, Farms, Farm crops, Farm processing, Public relations, Specialized training, Effectiveness, Developing country application, *Agricultural extension services, Villages, Demonstration programs.

Workers around the world have found that the result demonstration is a convincing teaching method. Many people improve their living conditions after seeing a result demonstration. A result demonstration brings scientific methods to everyday situations and compares new and proved practices with the old. This small pictorial booklet is a guide on how to institute the result demonstration.

PB-293 759/7 PC A03/MF A01
Oregon State Univ., Corvallis. International Plant Protection Center.
Weed Control Systems and Systems Utilization for Representative Farms in Developing Countries
Annual rept. 1977-78.
1978, 35p Rept no. 22-C-78

Keywords: *Weed control, Developing countries, Systems engineering, Utilization, Farm management, Technology, Agricultural economics, Economic factors, Production, Project planning, Research management, Financial management, Technical assistance, Information services, Oregon State University, Agricultural research projects, Developing country application.

The booklet is the annual report of the AID/Oregon State University weed control system research project. Discussed are the program's objectives, a review of activities, a work plan, financial review, and appendixes which include a bibliographic list, word distribution of program materials and publications, and a list of project personnel.

PB-293 760/5 PC A11/MF A01
Tata Energy Research Inst., Bombay (India).

Directory of Solar Energy Research Projects in India
Mar 78, 231p

Keywords: Directories, Research projects, *Solar energy, *India, Solar radiation, Heat storage, Energy storage, Space heating, Electric power generation, Heat exchangers, Air conditioning, Refrigeration, Heat pumps, Greenhouses, Listings, Solar collectors, Process heat, Photovoltaic conversion, Heat pipes, Solar ponds, Developing country application.

This directory contains data on about 140 research projects in the area of solar thermal conversion and photovoltaic processes. As a reference tool, the book should help in greater communication and cross fertilization of ideas in the field of solar energy and provide a panoramic view of solar energy research in India. The directory is divided into four sections: subject categories, list of institutions, list of investigators, and project information sheets.

PB-293 762/1 PC A03/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise: 150 Questions (150 Questions for a Prospective Manufacturer)
William M. Hoad. Mar 53, 48p
Text in French.

Keywords: *Management techniques, *Small businesses, Businesses, Manufacturing, Planning, Manufacturers, Organization theory, Finance, Product developing, Plant location, Equipment, Construction, Sales management, Personnel management, Production control, Marketing, Prices, Executive ability, Operating costs, Packaging, Insurance, Business education, Administration, Developing country application.

The booklet gives a prospective manufacturer the basic information he needs to start his enterprise. It covers administrative aptitude, business organization, the product, finance, insurance, siting, the factory, equipment and construction, planning and control, sales, personnel, packaging, marketing, costs and price, and general management.

PB-293 763/9 PC A04/MF A01
Arkansas State Dept. of Education, Little Rock. Vocational Div.
Formation Professionnelle: Conseils aux Maitres (Tips for Vocational Instructors)
1978, 52p
Text in French.

Keywords: *Education, Instructors, Schools, Instructional materials, Communicating, Organizing, Group dynamics, Leadership, Motivation, Guidelines, Classroom techniques, Teaching methods, Classroom arrangement, Developing country application, Instructional design, Teacher role.

The reference guide presents practical methods of controlling a class and passing on knowledge. Chapters are devoted to the task of the teacher; the organization of the course; preparing the lesson; principles of instruction; how to start a new class and instill interest in students; transmitting knowledge--introduction, presentation, on-the-job training, tests; various teaching methods--lectures, chats, demonstrations, films, visual aids, group discussions, blackboard, asking questions, guided studies; and how to conduct the class.

PB-293 765/4 PC A05/MF A01
West Virginia Univ., Morgantown.
Petite Entreprise: Manuel de Gestion Financiere (A Handbook of Small Business Finance)
Ralph B. Tower. 1961, 90p
Text in French.

Keywords: Financial management, *Management techniques, Businesses, Handbooks, Banking business, Finance, Working capital, Assets, Budgeting, Accounting, Investments, *Small businesses, Loans, Stocks and bonds, Financial services, Developing country application.

The information provided in the book makes it a basic handbook on financial management. Chapters are devoted to financial documents, financial management, business formulas and rates of turnover, short- and long-term loans - financing through stocks and promissory notes, sources of financial aid, government loans, and budgets and treasuries. A small bibliography is included.

PB-293 767/0 PC A03/MF A01
Agricultural Research Service, Washington, DC. Animal Husbandry Research Div.
L'Elevage du Lapin (Raising Rabbits)
1978, 41p
Text in French.

Keywords: Reproduction(Biology), *Rabbits, *Animal husbandry, Developing countries, Manuals, Breeding, Equipment, Feeding stuffs, Management, Animal diseases, Marketing, Food packaging, Tropical regions, Management, Developing country application.

The ABC's of rabbit raising are provided in this manual. Sections are devoted to choice of breed and breeders, lodging and equipment, hutches and burrows, feeding and watering, forage, cereals, supplements to the food, special feeds for gestating and lactating rabbits reproduction, care during transport, management of the stock, care in hot climates, prevention of disease and wounds, marketing, slaughter, butchering and packaging, and skinning.

PB-293 782/9 PC A17/MF A01
Egyptian Society of Civil Engineers, Cairo.
Proceedings of the Conference on Low-Income Housing Held at Cairo, Egypt on April 20-25, 1975
A. Moharram, H. A. Kaddah, G. E. Nassar, and L. S. Beedle. Apr 75, 399p
Grant NSF-ENG74-00503-A02
Prepared in cooperation with Academy of Scientific Research and Technology, Cairo. Joint Committee on Planning and Design of Tall Buildings, Bethlehem, PA.

Keywords: Housing planning, Low income groups, *Housing, Meetings, Egypt, Urban planning, Rural urban fringe, Urban relocation, Government policies, Social welfare, Residential buildings, Land use, Social effects, Project management, Social anthropology, Transportation, Services, Safety engineering, Maintenance, Economic impact, Masonry, Concrete construction, Steel construction, Low rent housing, Public housing.

Fifty countries participated in this conference which consisted of 15 sessions to discuss the global nature of the low-income housing shortage. The conference participants provide an in-depth discussion of Egypt's particular problems of spiraling population growth and the shift from rural to urban living. Among the highlights of the conference were: the urgency for a strong national housing policy; flexibility in standards and approaches, especially with regard to rural vs. urban solutions; first-priority consideration of user needs and incorporation of tenant ideas on the solution and management of their own housing requirement; strong government interaction; and application of management techniques, including total life-cycle project management, which guide the units' ultimate success.

PB-293 786/0 PC A13/MF A01
Rubber Research Inst. of Sri Lanka, Agalawatta.
Journal of the Rubber Research Institute of Sri Lanka, Volume 54, Part 1, Number 1
1977, 280p
Also pub. as ISSN 0035-9531.

Keywords: Trees(Plants), Growth, *Rubber, Meetings, Developing countries, Plant genetics, Elastomers, Production, Germination, Planting, Harvesting, Indonesia, Malaysia, Cost analysis, Prices, Yield, Latex, Tables(Data), Tropical regions, Developing country application, Hevea.

This journal presents the conference proceedings of the Rubber Research Institute of Sri Lanka for the purpose of exchanging knowledge in the rapid advances being made in the field of rubber technology. The journal includes nineteen reports presented at the conference by those associated with the rubber industry. A list of references is provided with each report.

PB-293 787/8 PC A12/MF A01
Rubber Research Inst. of Sri Lanka, Agalawatta.
Journal of the Rubber Research Institute of Sri Lanka, Volume 54, Part 1, Number 2
1977, 254p
Also pub. as ISSN 0035-9531.

Keywords: Trees(Plants), *Rubber, Plant growth, Developing countries, Meetings, Production, Elastomers, Fertilizers, Phosphorus, Nitrogen, Plant diseases, Fungicides, Plant reproduction, Planting, Malaysia, Education, Developing country application, Hevea.

This journal is the second part of the conference proceedings of the Rubber Research Institute of Sri Lanka presented for the purpose of exchanging knowledge in the rapid advances being made in the field of rubber technology. Included in this journal are twenty reports presented at the conference by those associated with the rubber industry. Also included is a reference list with each report.

PB-293 788/6 PC A05/MF A01
Maryland Univ., College Park. International Rural Water Resources Development Lab.
Development and Testing of the Robovalve
Final rept.
Yaron M. Sternberg, and Robert Knight. Jun 78, 76p
Contract AID/ta-C-1461

Keywords: *Water supply, *Valves, Fire hydrants, Faucets, Polyvinyl chloride, Seals(Stoppers), Diaphragms(Mechanics), Developing countries, Developing country application, Robovalves.

A new valve, Robovalve, has been developed and tested in the laboratory for wear and leakage. The Robovalve appears to be simple to operate, rugged, reliable with a minimum of moving parts, essentially leakproof, and capable of being manufactured locally. The experimental work and manufacturing of the Robovalve are described in this booklet. Also included are tables, figures, and appendices.

PB-293 801/7 PC A03/MF A01
Science and Education Administration, Beltsville, MD. Technical Information Systems.
Double Cropping and Interplanting, 1972-1977. Quick Bibliography Series
Charles N. Bebee. Apr 78, 33p Rept nos. NAL/BIBL-78/05, 928

Keywords: *Crops, Planting, Farm crops, Bibliographies, Developing countries, Grain crops, Soybean plants, Vegetable crops, Leguminous plants, Fruit crops, Tropical regions, Grasses, Developing country application, Double cropping methods.

This bibliography contains 230 citations on Double Cropping and Interplanting covering the period 1972-1977. Copies of titles listed are available from the National Agricultural Library.

PB-293 821/5 PC A05/MF A01
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A Demonstration Project to Establish a Technology Delivery System for Small and Medium-Sized Firms
Final rept.
Hardy S. Taylor, Ronald O. Lumpkin, and Sallie G. Daniell. Feb 79, 79p GIT-A-2030-F, EDA-79-076
Grant EDA-99-06-09647

Keywords: Businesses, *Technology transfer, National government, Universities, Technical assistance, *Information services, Research, Industries, Information systems, Coordination, *Small businesses, Demonstration projects, Research and development, Information centers.

The report discusses a technology transfer delivery system which links small and medium-sized firms to the base of technical knowledge and expertise represented by the National Technical Information Service and eight participating University Centers. Also included are recommendations for the appropriate mechanisms, procedures, and operational concepts that can be used in expanding its existing capabilities into a national system.

PB-29[illegible]/3 PC A05/MF A01
Econ[illegible] Research Service, Washington, DC.
Graphic Analysis: Applications in Agricultural Economics
Frederick V. Waugh. Nov 66, 82p Rept no. AGRICULTURE/HB-326

Keywords: *Agricultural economics, Developing countries, Graphic methods, Trends, Seasonal variations, Prices, Beef cattle, Yield, Corn plants, Time series analysis, Frequency distribution, Regression analysis, Food consumption, Production, Demand(Economics), Imports, Developing country application.

This report describes the various types of graphic presentation in relation to agriculture information. The graphic tool is almost indispensable in preliminary analysis. One of the main ways to find out about these relationships is through graphics.

PB-293 841/3 PC A04/MF A01
Appropriate Technology Development Association, Lucknow (India).
Some Developments of Appropriate Technology for Improving Physical Amenities in Rural Homes
Case study series no. 2
M. K. Garg. Feb 78, 69p

Keywords: *Sewage disposal, Community development, *Houses, Rural areas, Improvement, Developing countries, Water supply, Drainage, Sanitation, Toilet facilities, Illuminating, *India, Developing country application, Villages, Appropriate technology, Biogas.

In the state of Uttar Pradesh, work was done by the Planning Research & Action Institute for improving the rural technologies both for income generation and also in the field of community and home living. The booklet is a case study documenting the work done by the Institute in community and home living technologies.

PB-293 845/4 PC A04/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Manuel Pratique de l'Equipment Rural (V): Amenagement du Foyer (Village Technology Handbook: Home Improvement and Communications)
Jun 63, 74p
Text in French.

Keywords: *Handicrafts, *Home economics, Houses, Improvement, Stoves, Ovens, Furniture, Bedding equipment, Sewing machines, Pottery, Developing countries, Technical assistance, Developing country application, Self help, Villages.

This is the fifth of five books teaching methods to improve one's standard of living through self-help methods. This volume deals with home improvement (includes kitchen stoves, outside ovens, how to make soap at home, low cost stackable beds, locally made mattresses, potter's wheel sewing machine drives, small kilns, and salt glazes for pottery) and communications (includes inexpensive rubber cement, flashlight slide projectors, gelatin duplicators, paper stencils, and silk screen paint). Tables of metric and English measure conversions are included.

PB-293 863/7 PC A06/MF A01
Soil Conservation Service, Washington, DC. Engineering Div.
L'Amenagement de Points d'Eau dans les Pacages (Stock-water Developments: Wells, Springs, and Ponds)
C. L. Hamilton, and Hans G. Jepson. 1978, 102p
Rept no. FARMERS/BULL-1859
Text in French.

Keywords: *Animal husbandry, Livestock, *Water supply, Climate, Water wells, Cattle, Sheep, Swine, Reservoirs, Terracing, Ponds, Irrigation, Maintenance, Developing country application.

Various methods of watering livestock under various climate conditions are explained in this book. The water needs of cattle, sheep, and pigs are charted for herds of different sizes, and the geography for understanding water tables and artesian wells and other watering holes is explained. Terracing, reservoirs, irrigation, and maintenance and care of the watering devices is also thoroughly described.

PB-293 864/5 PC A07/MF A01
Agency for International Development, Washington, DC.
L'Engraissement et l'Exploitation des Bovins de Boucherie (The Feeding and Management of Beef Cattle)
Hudson G. Reynolds, R. L. Davis, and W. F. Edgerley. 1978, 128p
Text in French.

Keywords: *Animal husbandry, Beef cattle, Developing countries, Manuals, Forage grasses, Weight(Mass), Feeding stuffs, Nutritive value, Hormones, Quality, Fences, Silos, Equipment, Developing country application.

This booklet outlines all necessary considerations for the management of a beef herd. The pasture is viewed in light of climate, vegetation, cultivating forage, season, wind breaks, load per unit area, rodents and rabbits, watering, seasonal pastures, watering, subdividing lots, destroying shrubs, reseeding, and exploitation of herbs and shrubs. Fattening the animals is studied looking at sex, age, weight, and quality of the animal, storage of forage, nutritive requirements, rations, hormones, forage preparation, and balancing rations. Equipment such as fences, silos, corrals, shades, road grates, and back-scratchers is covered. Dehorning, castration, and branding are also discussed.

PB-293 865/2 PC A03/MF A01
National Research Council, Washington, DC.
Besoins Nutritifs de la Volaille (Nutrient Requirements of Poultry)
1966, 41p Rept no. PUB-1345
Text in French.

Keywords: Animal nutrition, *Poultry, Developing countries, Nutritional requirements, Chickens, Turkeys, Vitamins, Vitamin deficiencies, Feeding stuffs, Developing country application.

This booklet provides a chart of the various nutritional requirements of chickens and turkeys at different ages as well as layers, and explains the different symptoms of nutritional deficiency for each of nineteen vitamins and minerals. The study then provides charts of food requirements to profitably raise poultry and the daily nutritive requirements for poultry of different weights.

PB-293 866/0 PC A05/MF A01
Department of Agriculture Extension Service, Washington, DC.
Extension Teaching Methods and Other Factors that Influence Adoption of Agricultural and Home Economics Practices
Meredith C. Wilson, and Gladys Gallup. May 54, 87p
Rept no. EXTENSION/CIRC-495

Keywords: *Education, *Agriculture, Methodology, Farm management, Rural sociology, Rural areas, Learning, *Home economics, Instructional materials, Leadership, Instructors, Rural extension, Teaching methods, Rural population, Curriculum, Developing country application.

The bulletin is intended primarily as a reference manual for those who are concerned with the improvement in the use of extension teaching methods. The essential steps in the adult learning and teaching process are outlined. Important factors which affect the adoption of improved farm and home practices are discussed. Various teaching methods are compared on the basis of relative effectiveness and extent of use. Essential elements, principal advantages, and limitations are identified.

PB-293 867/8 PC A04/MF A01
Forest Products Lab., Madison, WI.
Exploitations Agricoles: Preservation des Poteaux de Cloture et des Bois de Construction (Preservative Treatment of Fence Posts and Farm Timbers)
Oscar Blew, Jr, and Francis J. Champion. 1978, 63p
Rept no. FARMERS/BULL-2049
Text in French.

Keywords: *Fences, *Wood preservatives, Agriculture, Buildings, Termites, Decomposition, Creosote, Phenols, Naphthenates, Soaking, Maintenance, Developing country application.

A cross-section of various chemical products and treatments to protect fences and buildings is presented here. Specifically, decomposition and insect damage are explained with a view to treatment. Pressure treatment of posts, hot and cold baths of preservative oils, soaking in cold baths, quick treatments, and treatments of low initial costs are all reviewed. Properties and use of more than a dozen treatment agents are described. Maintenance of posts after treatment is detailed, and other uses of wood in agriculture such as bridges and silos are studied.

PB-293 868/6 PC A08/MF A01
Department of Health, Education, and Welfare, Washington, DC.
Puericulture: Les Soins aux Bebes (Infant Care)
Laura L. Dittman. 1963, 155p
Text in French.

Keywords: *Children, *Health care delivery, Humans, Medical services, Nutrition, Diseases, Preventive medicine, Developing country application, Infant health care, Mothers.

The book explains how a mother can best take care of her baby from birth to the end of its first year. Topics covered include the importance of regularly consulting a doctor, preventing sibling rivalry, obtaining a birth certificate, and general care (breast feeding, nourishment for the mother, clothing, bedding, sickness, and grooming). Special chapters are devoted to overseeing new developments from the first to the fourth, the fourth to the eighth, and the eighth to the twelfth months. Two extensive annexes offer special counsel on special problems such as premature birth, vaccinations, poisons, and specific maladies; and nourishment.

PB-293 869/4 PC A05/MF A01
American Water Works Association, New York.
Distribution des Eaux: Le Calcul des Prix (Water Rates Manual)
Technical series rept. no. 2.
1964, 78p
Text in French.

Keywords: Cost analysis, *Water supply, Water distribution, Developing countries, Manuals, Prices, Water services, Expenses, Taxes, Developing country application, Water costs, Water rates.

This is the first of a series of four books that offer developing countries a guide to establishing a water distribution service. This book covers how to determine the proper price scale for the distribution of water. The cost price of the service, expenses, cost and expense distribution, and normal subscription rates are covered. Annexes study prior tariffs, rents, insurance, and fire protection.

PB-293 870/2 PC A03/MF A01
Agricultural Research Service, Washington, DC.
L'Abattage des Boefs a la Ferme (Slaughtering, Cutting, and Processing Beef on the Farm)
Richard L. Hiner. 1978, 48p
Text in French.

Keywords: Beef, *Food processing, Manuals, Freezing, Cutting, Cleaning, Separation, Meat, Equipment, Developing country application, Slaughtering.

This handbook for beef slaughtering and processing covers the entire procedure from handling and care of the animal before slaughtering to freezing, salting, drying, or smoking the beef. Topics covered include equipment, felling the animal, bleeding and skinning, opening the carcass, hoisting, cleaning, separating and examining the carcass, the offal, refrigeration, dissecting and rendering the meat.

PB-293 871/0 PC A02/MF A01
Farm Credit Administration, Washington, DC.
Comment on Obtient le Credit Agricole aux Etats-Unis (Getting and Using Farm Credit)
Nov 55, 22p
Text in French.

Keywords: *Agricultural economics, Financial management, Credit, Farms, Agriculture, Finance, Farm management, Payments, Inventory control, Banking business, Economic forecasting, Financial services, Loans, Developing country application.

The booklet addresses the importance of consulting professional farm credit managers, making an annual inventory, planning ahead, making a plan for repayment of the credit, respecting payment due dates, and using the proper kind of credit for your needs.

PB-293 872/8 PC A04/MF A01
Agricultural Research Service, Beltsville, MD. Animal Disease and Parasite Research Div.
Parasites Internes du Porc (Internal Parasites of Swine)
1967, 63p Rept no. FARMERS/BULL-1787
Text in French.

Keywords: *Animal diseases, Parasites, Swine, Preventive medicine, Therapy, Livestock, Domestic animals, Protozoa, Trematoda, Nematoda, Worms, Developing country application, Cestoda.

The book presents a thorough study of the general effects of internal parasites, preventive measures, and treatment for the elimination of parasites. Four separate chapters are devoted to Protozoa, Trematodes, Cestodes, and Nematodes; in all seventeen separate varieties of parasites are discussed. A resume of preventive measures is included.

PB-293 873/6 PC A04/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise: La Conception des Produits (Design is Your Business)
Mar 63, 64p Rept no. SMALL BUSINESS MANAGEMENT SER-10
Text in French.

Keywords: *Management techniques, *Product development, Production management, Decisionmaking, Coordination, Manufacturing, Packaging, Sales management, Marketing, Production engineering, Engineers, Design criteria, Consulting services, Design preferences, Developing country application.

Product design is studied in light of product manufacture, packaging, and sales. The coordination of product design and packaging as well as using the services of a consulting engineer are covered, but the businessman's final responsibility for design decisions over the consulting engineer is stressed. Essential principles of design policy are outlined and a short bibliography is included.

PB-293 874/4 PC A05/MF A01
Agricultural Research Service, Beltsville, MD. Animal Disease and Parasite Research Div.
Les Maladies Parasitaires du Mouton (Parasites and Parasitic Diseases of Sheep)
J. T. Lucker, and A. O. Foster. 1978, 76p Rept no. FARMERS/BULL-1330
Text in French.

Keywords: *Animal diseases, Parasites, Parasitic diseases, Sheep, Signs and symptoms, Life cycles, Therapy, Preventive medicine, Sites, Developing country application.

Sheep are extremely susceptible to parasitic attacks. This book details the likely locations, appearance, symptoms, life cycle, and methods of treatment and prevention of infestations of both internal and external parasites of sheep. Thirty-nine different species or genera are studied and a list of common and scientific names of each parasite covered is included.

PB-293 876/9 PC A02/MF A01
Cornell Univ., Ithaca, NY. Dept. of Agronomy.
Fertilizacion con Nitrogeno en los Tropicos Humedos (Nitrogen Fertilization in the Humid Tropics)
Richard H. Fox. 1974, 19p Rept no. 72-17
Text in Spanish. Prepared in cooperation with Puerto Rico Univ., Rio Piedras.

Keywords: *Fertilizers, Fertilizing, Tropical regions, Developing countries, Nitrogen, Soil properties, Urea, Ammonium sulfate, Planting, Puerto Rico, Africa, Latin America, Developing country application.

In the humid tropics it is possible to have a healthy and abundant crop of non-leguminous plants only with the application of Nitrogen (N) fertilizer to the soil. Although all soil contains certain levels of organic N (amounts varying in different areas), more may be necessary. This amount will depend on the N level present, the soil's humidity, and the speed of the absorption process. The principal source of N fertilizer in Latin America, as in Africa, is derived from ammonium sulfate, (NH4)2SO4, although the acid residue; the high cost of transportation in relation to the amount of N received; and the low content of N in the ammonium sulfate are definite deterrents to using this source. Urea, CO (NH2)2, having a much higher content of N, thereby being more cost effective in relation to transportation, is difficult to handle because of its hygroscopicity. Urea is most effective when applied after planting. Charts/tables showing N/soil experiments are included along with an extensive bibliography.

PB-293 916/3 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Vulgarisation Agricole: La Planification (Extension Looks at Programm Planning)
1966, 32p Rept no. EXTENSION/CIRC-478
Text in French.

Keywords: Agricultural economics, Handbooks, Project planning, Organizations, Personnel, Objectives, History, Developing country application, *Agricultural Extension Services.

Designed specifically for accountable managers of agricultural extension programs, this handbook covers the history, theory, and practice of extension services. Inspectors, specialists, and other groups and organizations must be planned for to make the system work. The necessity of accommodating the program to the regional sociological and other conditions is stressed, and the creation and function of the program broken down into stages for easy understanding. The important factors of planning such as administrative subsidy and public comprehension are covered, and follow-up actions explained.

PB-293 917/1 PC A04/MF A01
Design Alternatives, Inc., Washington, DC.
Save Energy: Save Money
Eugene Eccli, and Sandra Fulton Eccli. Aug 77, 52p
Sponsored in part by National Center for Appropriate Technology, Butte, MT.

Keywords: *Energy conservation, Heating, Houses, Improvement, Savings, Cost control, Windows, Weatherstripping, Doors, Floors, Carpets, Furnaces, Stoves, Water heaters, Developing countries, Appropriate technology, Developing country application.

Large savings can be made when people become aware of the problems of home heating and some low-cost ways of solving them. The booklet looks at the most common and severe problems. Directions are given for ways to save money which you can apply yourself. These are practical suggestions which cost little and can help right away.

PB-293 919/7 PC A03/MF A01
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Trade-Offs Between Farm Income and Selected Environmental Indicators: A Case Study of Soil Loss, Fertilizer, and Land Use Constraints
Technical bulletin
Aug 76, 33p Rept no. TB-1550

Keywords: Income, *Agricultural economics, Farms, Mathematical models, Linear programming, Constraints, *Soil erosion, *Fertilizers, *Land use, Flood control, Yield, Farm crops, Economic impact, Budgeting, Revenue, Government policies, Developing country application, Crop rotation, Tradeoffs, Environmental quality.

Changes in farm income associated with alternative restrictions on soil loss, fertilizer use, and the land use mix are analyzed. A linear programming model is used to estimate the effects of the restrictions, which were developed as indicators of environmental quality. Effects of a partial flood control program on farm income and the environmental quality indicators are also examined. Under conditions assumed in this analysis, restrictions on fertilizer use reduce net farm income more than constraints on either soil loss or the land use mix. Soil loss constraints reduce net revenue and fertilizer use while increasing the diversity of land use. Constraints on the land use mix reduce net revenue and fertilizer use. Flood retarding structures mitigate revenue losses only slightly and do not significantly change effects produced by environmental constraints. Public policies requiring lower erosion rates, reduced fertilizer use, or increased diversity of land use could affect rural resources and food and fiber production. Achieving any of those environmental changes has accompanying trade-offs in farm income.

PB-293 921/3 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Agriculture.
Improving Farm Production in Tropical and Sub-Tropical Regions of Limited Rainfall
Technical series bulletin.
Jun 73, 28p Rept no. TSB-4

Keywords: Water conservation, Tropical regions, Farm crops, *Crops, Developing countries, Arid land, Production, Rainfall intensity, Soil water, *Water supply, Terracing, Precipitation(Meteorology), Water consumption, Soil fertility, Forage crops, Grasses, Developing country application, Crop rotation.

The report describes farming systems that should aid in making the most effective use of available moisture in those developing countries that have limited annual precipitation.

PB-293 955/1 PC A05/MF A01
General Accounting Office, Washington, DC. International Div.
Efforts to Improve Management of U.S. Foreign Aid - Changes Made and Changes Needed
29 Mar 79, 79p Rept no. ID-79-14

Keywords: Foreign aid, Management, Recommendations, Developing countries, National government, *Technical assistance, *Management techniques, Agency for International Development.

Over the past 5 years, GAO and others have made a number of recommendations to improve those U.S. programs aimed at bettering the way of life in less developed countries. This followup report shows that AID has taken steps to improve program management but needs to do more in several areas.

PB-293 984/1 PC A03/MF A01
Agricultural Research Service, Washington, DC.
The Herringbone Milking System. Economic Appraisal, Labor Efficiency Analysis, and Adjustment Possibilities
Morris M. Lindsey. Sep 60, 35p Rept no. PRODUCTION RESEARCH-45

Keywords: *Agricultural economics, *Dairies, Dairy equipment, Performance evaluation, Design, Improvement, Dairy cattle, Cost analysis, Efficiency, Comparison, Farm buildings, Manpower, Developing country application, Herringbone milking system.

One of the more important new developments which seem to hold promise for greater efficiency in dairy farming is the herringbone milking system. This system combines well with such modern improvements as loose housing of dairy cows, pipeline milking, and bulk handling of feed and milk. In this report, new information on the herringbone milking system has been brought together and analyzed. The herringbone is compared with other milking systems for different farm situations, and its possible impact on dairy farming is considered. The results should be of interest to dairy farmers who are considering changes in their milking systems, particularly those who are thinking also of expanding the size of their herds.

PB-294 013/7 PC A23/MF A01
Inter-American Development Bank, Washington, DC.
Proceedings of the Seminar on Agricultural Policy: A Limiting Factor in the Development Process Held at Washington, DC. on March 17-21, 1975
11 Aug 75, 528p

Keywords: *Agriculture, Developing countries, Government policies, *Agricultural economics, Livestock, *Animal husbandry, Finance, Food supply, Food consumption, Prices, Farm management, Rural areas, Industries, Technology, Agricultural production, Rural development, Developing country application, Industrialization, Handicrafts.

The seminar was designed to help institutions in the member countries develop and adopt suitable policies for formulating agricultural and livestock development programs and to seek a greater utilization of bank resources in meeting these objectives. More than 60 experts from the Inter-American Development Bank's 22 member countries in Latin America, as well as Canada and the United States participated in the seminar on agricultural policy. Participants were high-level profes-

sionals, most of whom hold key planning and executive posts in their respective Governments, as well as 20 observers from International and other organizations.

PB-294 021/1 PC A07/MF A01
Hawaii Univ., Honolulu. Cooperative Extension Service.
Strategies for Improving Small Farmer Development in the Tropics
May 77, 146p Rept no. MPUB-152
Contract ARS-12-14-5001-88
Proceedings of Workshop, Held at the University of Hawaii, Honolulu on May 23-26, 1977.

Keywords: *Agricultural economics, Farms, Tropical regions, Developing countries, Meetings, Education, Government policies, Rural areas, Developing country application, Small farms.

The definition of a 'Small Farmer' in this report is grouped as the rural disadvantaged with little or no access to political power, institutional services, full employment, educational opportunities, societal bae, and amenities available to some other segments of the non-farm population. This workshop was devoted to working sessions in developing outreach strategies for the small farmer. Development schemes and case studies were presented and discussed by each of the participants but no consensus unanimity in program approach was reached.

PB-294 030/2 PC A15/MF A01
Design Alternatives, Inc., Washington, DC.
Proceedings of Workshop on Appropriate Technology Held January 23-25, 1978
Final rept.
1979, 349p NSF/RA-790002
Contract NSF-C-ERS77-21824

Keywords: Research management, Meetings, Technology assessment, Planning, Guidelines, Policies, Decision making, Problem solving, Management, *Technology transfer, Recommendations, Appropriate technology, Technology utilization.

The purpose of the project was to convene a workshop of people interested in appropriate technology to examine and document locally-focused issues in this field, and to contribute recommendations for a research agenda and program guidelines which could be considered in planning a distinct research program in appropriate technology. For the purposes of this report, appropriate technology is defined as a socio-technical process which encompasses technology design, assessment, and use. This process seeks to optimize solutions, wherever possible, through reliance on local problem-solving capabilities as well as sensitivity to environmental and cultural impacts. Information about the background and purposes of the project, including the rationale for a research program in appropriate technology, the research agenda and program development guidelines is presented. Background information about the issues examined during the project including copies of the project overview and overview of workshop events is given. The document also contains the 25 final papers written by workshop facilitators and participants, as well as other documentation of the ideas and recommendations made by those who attended the workshop. The agenda recommends three main research modes; socio-technical systems research, policy research, and technology transfer research.

PB-294 035/1 PC A22/MF A01
Development Alternatives, Inc., Washington, DC.
Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects. Volume I
Final rept.
Elliott R. Morss, John K. Hatch, Donald R. Mickelwait, and Charles F. Sweet. May 75, 513p
Contract AID/CM/ta-C-73-41

Keywords: *Agricultural economics, Farm management, Developing countries, Productivity, Personnel development, Rural areas, Project planning, Models, Farm crops, Cooperation, Developing country application.

The purpose of this report is to provide information on what can be done to increase the well-being and productivity of the small farmer in the Third World so as to become self-sustaining. The volume is divided into five chapters with the following topics: (1) research and focus; (2) project success; (3) local action; (4) project components for small farmer development; and (5) summary of findings and their implications for AID and other major donors. Three appendices cover methodology; information systems to support rural development projects; and implication of the findings for future research.

PB-294 036/9 PC A19/MF A01
Development Alternatives, Inc., Washington, DC.
Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects. Volume II. Case Studies
Charles F. Sweet, Elliott R. Morss, John K. Hatch, and Donald R. Mickelwait. May 75, 443p
Contract AID/CM/ta-C-73-41

Keywords: *Agricultural economics, Farm management, Project planning, Productivity, Developing countries, Rural areas, Models, Farm crops, Cooperation.

This document is a complement to the analysis in Volume I. It is comprised of 38 write-ups of the projects studied.

PB-294 068/2 PC A06/MF A01
Economic Research Service, Washington, DC.
Manual for Agricultural Capital Project Analysis
David W. Brown. Feb 74, 107p

Keywords: *Agricultural economics, Agriculture, Projects, Benefit cost analysis, Developing countries, Agricultural economics, Capital, Financial management, Investments, Government policies, Economic analysis, Planning, Forecasting, Yield, Earnings, Farm management, Rural areas, Agricultural engineering, Manuals, Developing country application.

The manual was prepared for planners, officials, and other key professionals of developing countries. It deals with actual agricultural projects, linkages of projects to overall economic development, information gathering, and project implementation. Concepts and methods for conducting benefit cost analysis are discussed.

PB-294 095/5 PC A06/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
African Rural Employment Research Network - The Evolution of Alternative Rural Development Strategies in Ethiopia: Implications for Employment and Income Distribution
African rural employment study
Tasfai Tecle. 1975, 123 Rept no. AREP-12
Contract AID/csd-3625
Prepared in cooperation with Addis Ababa Univ. (Ethiopia). Inst. of Development Research.

Keywords: *Employment, Income, Rural areas, *Ethiopia, Evaluation, Rural sociology, Economic development, *Regional planning, Agricultural economics, Farm management, Credit, Organization theory, Resource allocation, Production, Rural development, Program evaluation, Job development, Developing country application.

The report documents the evolution and performance of Ethiopia's rural development programs and draws lessons for future programs. Ethiopia's government has instituted dual equity/production programs which are designed to improve the lives of the masses in the countryside.

PB-294 127/6 PC A03/MF A01
Winrock International Livestock Research and Training Center, Morrilton, AR.
Proceedings of a Workshop on the Role of Sheep and Goats in Agricultural Development Held at Morrilton, Arkansas on November 15-17, 1976
E. A. Oltenacu, and A. Martinez. Nov 76, 45p

Keywords: *Animal husbandry, Sheep, Goats, *Agricultural economics, Meetings, Developing countries, Production, Meat, Milk, Fibers, *Animal diseases, Parasites, Research projects, Attitudes, Constraints, Improvement, Developing country application.

The objectives of this project include: (1) documentation of production coefficients for sheep and goat systems, (2) identification of constraints and potentials for production and marketing systems, (3) assessment of research, training and development programs involving sheep and goats, (4) characterization of prevailing attitudes of policy makers and planners toward sheep and goats, and (5) suggestion of projects and locations for sheep and goat improvement projects from which important social and economic benefits are likely to result. Participants in this workshop included international authorities on sheep and goat production and on agricultural development.

PB-294 130/0 PC A07/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Training Manual for Rice Production
Vo-Tong Xuan, and Vernon E. Ross. 1976, 147p

Keywords: *Rice, *Training, Production, Rice plants, Developing countries, Manuals, Cultivation, Plows, Levees, Maintenance, Seeds, Germination, Dormancy, Nitric acid, Planting, Fertilizers, Weed control, Insect control, Plant diseases, Harvesting, Drying, Storage, Developing country application.

This manual has been developed to serve those involved in teaching the new rice technology. In addition, it can serve scientists and farmers alike, as a reliable guide to the performance of the tasks involved in producing irrigated rice. The manual contains all the lessons on the skills of producing rice.

PB-294 131/8 PC A05/MF A01
Agency for International Development, Washington, DC. Bureau for Technical Assistance.
Regional Development: A Review of the State-of-the-Art
James C. Miller. Aug 74, 80p

Keywords: *Regional planning, Economic development, Developing countries, Rural areas, Urban areas, Urban development, Growth, Centers, Models, Development, Coordination, Organizing, Management, Employment, Productivity, Planning, Developing country application, Regional development.

A major impediment to the development and growth of the less developed nations is the deficient spatial organization of these nations, i.e., the absence of hierarchical system of metropoli, cities, towns, and smaller central places through which growth and development impulses are transmitted. The first part of this study discusses the theoretical underpinnings of this notion, drawing together and synthesizing elements of economic development theory, central place theory, location theory, and information theory into a model of the spatial diffusion of economic growth. Next, implications are drawn from the model concerning the deficiencies of spatial organization of developing countries, and several strategies aimed at correcting these deficiencies are discussed. An overview of regional development planning experiences in developed and developing countries is then undertaken, and several conclusions complete the study.

PB-294 137/5 PC A11/MF A01
Winrock International Livestock Research and Training Center, Morrilton, AR.
The Role of Sheep and Goats in Agricultural Development. A State of the Arts Study
Aug 77, 230p

Keywords: *Animal husbandry, Sheep, Goats, *Agricultural economics, Reviews, Developing countries, Production, Tropical regions, Proteins, Meat, Milk, Wool, Demand(Economics), Government policies, North Africa, Middle East, Developing country application.

Tho approximately 1.5 billion sheep and goats of the world are a major resource for feeding and clothing mankind. The current role of sheep and goats in developing countries ranges from a very minor level of production in some of the countries in the wet tropics to being the principal source of animal protein in certain North African and Middle Eastern nations. The lack of understanding of the roles of sheep and goats has generally resulted in their being ignored as a part of the sustenance and development cycle for small farmers and pastoralists. It is hoped that this report will provide the stimulus for attainment of the necessary under-

standing to determine the proper role for sheep and goats in future agricultural development efforts.

PB-294 138/3 PC A03/MF A01
Economic Research Service, Washington, DC.
Economics of Protein Improvement Programs in the Lower Income Countries
Foreign economic development rept.
Lyle P. Schertz. Jul 71, 43p Rept no. FEDR-11

Keywords: *Proteins, Grain crops, *Agricultural economics, *Crops, Developing countries, Improvement, Sources, Human nutrition, Income, Food consumption, Plant genetics, Cost analysis, Foreign countries, Brazil, Pakistan, Technical assistance, Developing country application.

This paper presents an overview of the world protein problem and some major economic considerations important to nutrition improvement programs. It discusses sources and uses of protein, the role of income, and benefit-cost dimensions of various strategies aimed at improving adequacy of protein consumption in lower income countries.

PB-294 139/1 PC A03/MF A01
Institucion No Lucrativa Al Servicio de la Iniciativa Privad, San Pedro (Argentina).
Design of a Factory for the Productivity of Tomato Paste
Ing. Walter Huppke, Guillermo Medina Santos, and S. E. White. 1962, 32p

Keywords: *Food processing, *Food products, *Vegetables, Tomatoes, *Industrial plants, Machinery, Sanitation, Production capacity, Production methods, Cost estimates, Farm processing, Developing countries, Operating costs, Labor estimates, Industrial management, Production planning, Technical assistance, Developing country application.

The report is a complete study of the various factors which enter into the economic aspects of a tomato products industry.

PB-294 140/9 PC A06/MF A01
Little (Arthur D.), Inc., Cambridge, MA.
Chemical Processing, An Operation Manual for Cooperative Program Use
Jun 57, 164p

Keywords: *Chemical industry, Manuals, Design criteria, Process charting, Equipment, Dyers, Evaporators, Pressure filters, Heat exchangers, Cost analysis, Rotary filters, Management planning, Performance evaluation, Developing country application.

This manual describes some of the basic equipment for the establishment of chemical processing industries. Six types of equipment are described: dryers; evaporators; pressure filters; jacketed process vessels; heat exchangers; and rotary vacuum filters. The manual is designed as a guide for the operation of many of the more important chemical process systems, which are significant in a growing industrial economy. It should be of help in the planning stages of almost any process industry.

PB-294 146/6 PC A08/MF A01
Cornell Univ., Ithaca, NY. Rural Development Committee.
Local Organization for Rural Development: Analysis of Asian Experience
Special series on rural local government
Norman Uphoff, and Milton J. Esman. Nov 74, 174p Rept no. RLG-19

Keywords: *Agriculture, *Socioeconomic status, Organization theory, Local government, Rural areas, Employment, Economic development, Welfare, Income, Agricultural products, Productivity, Citizen participation, Population growth, Research, Yield, Services, Foreign countries, Rural development, Governmental structure, Asian studies, Institutional role, Developing country application.

The report analyzes and summarizes the findings of a study undertaken to clarify the role of rural local institutions in the rural development process. The study puts a special emphasis on agricultural productivity, income, local participation, and rural welfare. Development experiences in several Asian countries are examined.

PB-294 147/4 PC A04/MF A01
International Development Research Centre, Ottawa (Ontario).
Scientific and Technical Information in Pakistan. The Report of a Joint IDRC/UNDP Mission, October-November 1976
Nov 78, 64p
Prepared in cooperation with United Nations Development Programme, New York. Sponsored in part by Pakistan Science Foundation, Islamabad.

Keywords: Information systems, *Pakistan, User needs, *Information services, Decentralization(Dispersal), Information centers, Developing countries, Professional personnel, Librarians, National government, Cooperation, Developing country applications.

The Pakistan National Scientific Documentation Centre (PANSDOC), was established in 1957, with technical assistance from Unesco, to provide scientific workers and others with services such as the procurement of documents, compilation of bibliographies and translations. In the late sixties, a project was formulated to convert this group into a fully-fledged Pakistan Scientific and Technological Centre (PASTIC), and work on this expanded project was started in 1974. The PASTIC project was based on the concept of a contralized service, which was consistent with what was then being attempted by most developing nations. Pakistan organized a joint IDRC/UNDP Mission, consisting of experts from Unesco, IDRC and UNIDO, to conduct a detailed study of the S&T information needs in Pakistan and make recommendations on the future structure and development of a national S&T information network. A comprehensive report was produced based on a detailed analysis of the existing situation and anticipated future requirements. Since the contents of the report are relevant not only to Pakistan but to other developing countries faced with similar problems, it was decided to publish the mission report with IDRC assistance, for wider circulation.

PB-294 217/5 PC A03/MF A01
Virgin Islands Dept. of Conservation and Cultural Affairs, Charlotte Amalie, St. Thomas.
Demonstration of Virgin Islands Small Boat Fishing Techniques
Completion rept. Jul 75-Sep 78
Susan E. Coleman, Joseph R. Sylvester, Joseph A. LaPlace, Kon Turbe, and Arthur E. Dammann. Mar 79, 33p NOAA-79030604

Keywords: *Fisheries, Fishing, Virgin Islands, *Boats, Design, Traps, Nets, Operating costs, Construction materials, Performance evaluation, Dories.

Virgin Islands fishery development has centered on technological introduction and resource diversification. This report provides a descriptive study on the use of an easily constructed rough-water dory and assessment of its performance in local waters. This assessment took the form of simulated commercial fishing and explored a variety of fishing techniques to measure daily catch potential in local waters. The basic boat design was suitable to local rough water conditions but lacked sufficient working deck space. Lengthening the boat to 20 feet increased operating expenses. Subsequent shortening to 17 feet indicated that the most economical size may lie between 17 and 18 feet, with a 65-85 hp outboard motor. Gear loss and fuel were the major expense items. Traps, line fishing, gill nets, and bait nets produced more than 90% of the total catch.

PB-294 218/3 PC A05/MF A01
Wisconsin Univ. Extension, Madison. Sea Grant Advisory Services.
Perch Fingerling Production for Aquaculture
Richard W. Soderberg. 1978, 82p WIS/SG/AR-421, NOAA-79030201
Proceedings of a Conference held at the University of Wisconsin on December 12, 1977.

Keywords: Perch, *Aquaculture, Meetings, Reproduction(Biology), Life cycles, Growth, Tanks(Containers), Fisheries, Temperature, Budgeting, Cost engineering, Reviews, Perca flavescens, Sea Grant program.

Perch fingerling production was the subject of a conference held at the University of Wisconsin on December 12, 1977. Because of their small market size and limited growth potential, perch aquaculture will be a fingerling-intensive proposition. Larger numbers of fingerlings will be required to produce a given weight of perch than for most other species being cultured. For this reason, purchased fingerlings become a major element in the cost of producing a pound of perch. From an economic standpoint, it is difficult to fit a five to 10 cent fingerling into the cost of producing a fish that will sell for 30 to 40 cents when grown out. The purpose of this conference is to present what is considered the state of the art in perch fingerling production to help reduce the cost of this element of perch aquaculture.

PB-294 233/2 PC A03/MF A01
Armstrong Cork Co., Lancaster, PA.
New Foreman Training Plan
Feb 54, 27p Rept no. TB-14
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Industrial Resources.

Keywords: *Management training, *Training, Supervisors, Personnel development, Leadership, Industrial training, Production management, Supervision, Industrial relations, Personnel management, Manufacturing, Job analysis, Supervisory training, On job training, Supplementary education, Developing country application.

The booklet is designed as a management tool for training new foreman. Procedures are provided for on-the-job training, plant supplementary training and production management courses.

PB-294 234/0 PC A02/MF A01
Centro Cooperativo Tecnico Industrial, Tegucigalpa (Honduras).
A Proposed Factory in Honduras for the Processing of Pineapples and Other Tropical Fruits
Walter F. Huppke. 1965, 18p

Keywords: *Fruits, *Food processing, *Honduras, *Food products, *Industrial plants, Food industry, Feasibility, Technology, Promotion, Developing countries, Technical assistance, Developing country application, Pineapples.

The purpose of the report is to present data regarding the pineapple industry in Honduras. This information should be an aid to investors to determine the feasibility of establishing a fruit processing industry.

PB-294 235/7 PC A04/MF A01
Economic Research Service, Washington, DC.
Energy Use and Conservation in the Poultry and Egg Industry
George B. Rogers, Verel W. Benson, and Donald Van Dyne. Oct 76, 58p Rept no. USDA/AER-354
Errata sheet inserted.

Keywords: Fuel consumption, Electricity, *Poultry, Eggs, Poultry houses, Marketing, Space heating, Illuminating, Ventilation, Industries, Energy consumption, *Energy conservation, Poultry industry, Electric power consumption, Developing country application.

Estimates of energy use in the poultry and egg industry are discussed by commodity, type of fuel, season, and function. In 1974, the 146.5 trillion Btu's used in poultry production and marketing cost producers almost $550 million. Although the efficiency of energy use in this industry has increased in the last decade, energy conservation measures discussed in this report can yield further substantial savings. Development and implementation of new technologies may reduce the use of critical forms of energy in the future. This study is intended to provide a basis for further energy research in the poultry and egg industry and to serve as a prototype for similar energy studies on other agricultural industries.

PB-294 237/3 PC A04/MF A01
Agricultural Research Service, Beltsville, MD.
Commercial Rabbit Raising
R. B. Casady, P. B. Sawin, and J. Van Dam. Oct 71, 73p Rept no. AGRICULTURE HANDBOOK-309
Sponsored in part by Agency for International Development, Washington, DC.

Keywords: *Rabbits, *Animal husbandry, Handbooks, Feeding stuffs, Buildings, Reproduction(Biology), Equipment, Marketing, Agricultural economics, Wool,

Standards, Production, Sanitation, Developing country application.

This handbook was issued to help country agricultural agents, State colleges of agriculture, and the U.S. Department of Agriculture answer the many thousands of requests received each year from commercial and professional rabbit producers for information about rabbits.

PB-294 238/1 PC A11/MF A01
Agency for International Development, Panama City (Panama).
Panamanian District: A Case Study in the Sociology of Development
James Wyche Green, and Jose Raul Garcia de Paredes. Jul 69, 229p

Keywords: *Economic development, Sociology, *Panama, Agriculture, Livestock, Municipalities, Local government, Education, Health, Religions, Ethics, Community development, Social effect, Case studies, Governmental structure, Public education, Public health, Voluntary agencies, Developing country application.

The intent of the document is to derive from the study of Macaracas the most relevant generalizations for the development of all of the districts of Panama. The study includes the areas of agriculture and livestock, municipal government, public education, public health, other government offices, voluntary agencies, religion and morals, and community development. The document includes illustrations and annexes.

PB-294 246/4 PC A03/MF A01
Farm Credit Administration, Washington, DC.
Le Systeme de Credit Agricole Cooperatif aux Etats-Unis (The Cooperative Farm Credit System)
Jan 61, 34p
Text in French.

Keywords: *Agricultural cooperatives, Credit, Agriculture, Developing countries, Finance, Organization theory, Cooperation, Sources, History, Farm management, Financial management, Financial services, Loans, Developing country application.

The basic functions and organization of a farm credit system are outlined in this manual for developing countries. Detailed analysis is given for sources of agricultural credit, and a history of the U.S. Agricultural Credit Cooperative is given. The Cooperative's methods of response to the needs of its members is thoroughly explained.

PB-294 262/1 PC A09/MF A01
Bangladesh National Scientific and Technical Documentation Centre, Dacca.
A Directory of Scientists and Technologists of Bangladesh
Ahsan A. Biswas. Feb 76, 200p Rept no. BANSDOC-BIBLIO-113

Keywords: *Research and development, Scientists, *Bangladesh, Directories, Professional personnel, Engineers, Librarians, Instructors, Biographies, Developing country application.

This directory contains over 1500 entries of scientists and technologists in Bangladesh. Entries have been divided into 23 sections on a broad subject basis and have been arranged according to Universal Decimal Classification. Bibliographic data has been provided for each entry.

PB-294 264/7 PC A09/MF A01
Bangladesh National Scientific and Technical Documentation Centre, Dacca.
Current Scientific and Technological Research Projects in the Universities and Research Institutions of Bangladesh
M. Q. Islam, M. O. Ghani, M. S. A. Khan, Nasera Begum, and Nasiba Khatun. 1978, 193p Rept no. BANSDOC-BIBLIO-135

Keywords: *Research and development, *Science policy, Research projects, *Bangladesh, Directories, Universities, Agriculture, Social sciences, Medicine, Industries, Developing country application.

The directory is a comprehensive listing of the research activities of the Universities and Research Institutions of Bangladesh. Through this publication, a researcher can avoid duplication by being informed of the research presently being done or research that has been done by a particular agency on a particular problem or problems in the country of Bangladesh.

PB-294 272/0 PC A02/MF A01
Agricultural Research Service, Beltsville, MD. Soil and Water Conservation Research Div.
Sprinkler Irrigation
Claude H. Pair. Nov 68, 10p Rept no. LEAFLET-476

Keywords: *Irrigation, Sprinkler irrigation, Manuals, Operations, Pipelines, Sprinklers, Design, Pumping stations, Maintenance, Portable equipment, Selection, Developing country application.

The operation of a sprinkler irrigation system is outlined in this pamphlet. Discussed are the parts of a system; factors to consider in choosing a system; system design; buying a system; and the operation and maintenance of a system.

PB-294 283/7 PC A99/MF A01
Governmental Affairs Inst., Washington, DC. Agricultural Sector Implementation Project.
Managing Planned Agricultural Development
Albert Waterston, Wayne Weiss, and John L. Wilson. Aug 76, 622p
Contract AID/csd-3650

Keywords: Agriculture, *Agricultural economics, Developing countries, Management, Rural areas, Economic development, Regional planning, Conflicts, Allocations, Demand(Economics), Marketing, Policies, Employment, Financing, Project planning, Constraints, Organizations, Education, Developing country application.

The prime objective of this report is to help bridge the gap between planners and farmers by providing information for improving the capabilities of those in the developing countries concerned with the planned development of the agriculture sector. Agricultural development is herein conceived as an essentially intra-sectoral activity which includes all services necessary to its promotion.

PB-294 284/5 PC A04/MF A01
Agricultural Research Service, Washington, DC.
Maladies Communes et Parasites des Volailles (Communicable Diseases and Parasites of Chickens)
Marion M. Farr, and Edward H. Lund. 1962, 58p
Text in French.

Keywords: *Animal diseases, Chickens, *Poultry, Diseases, Parasites, Livestock, Domestic animals, Newcastle disease, Infectious diseases, Viral diseases, Salmonella, Bacteria, Therapy, Signs and symptoms, Preventive medicine, Mites, Ticks, Worms, Lice, Animal husbandry, Veterinary medicine, Developing country application.

The booklet is a translation of eight English language pamphlets entitled: Newcastle Disease; Salmonella Infections in Poultry; Intestinal Coccidosis of Chickens; Blackhead of Turkeys and Chickens; Poultry Mites; Fowl Tick; Tapeworms of Poultry; Chicken Lice. Each disease or affliction is explained by analyzing its life cycle, mode of transmission, internal and external symptoms, and methods of prevention and cure.

PB-294 285/2 PC A05/MF A01
Massachusetts Univ., Amherst. Dept. of Entomology and Plant Pathology.
L'Elevage des Abeilles (Beekeeping)
Frank R. Shaw. 1966, 81p
Text in French.

Keywords: *Bees, Production, Manuals, Insects, Harvesting, Animal diseases, Maintenance, Developing country application.

The composition and workings of a bee colony is explained in detail in this manual's introduction to make the necessity for proper maintenance of the colony understood. Chapters are devoted to the preparation of the annual chores, winter care, harvesting the honey, raising queen bees, bee diseases, and the production of honey in sections.

PB-294 286/0 PC A08/MF A01
Forest Service, Washington, DC.
Les Brise-Vent (Tree Windbreaks for the Central Great Plains)
Ralph A. Read. 1978, 159p
Text in French.

Keywords: *Wind pressure, *Plants(Botany), *Soils, Farms, Trees(Plants), Windbreaks, Manuals, Wind velocity, Atmospheric temperature, Soil conservation, Farm crops, Protection, Livestock, Selection, Spacing, Developing country application.

Windbreaks can contribute greatly to soil conservation. This manual covers all aspects of effectively using windbreaks. The effects of a windbreak on the wind speed, temperature and humidity of the air and soil, and the properties of the soil are discussed as is its action on plants and animals. Different types of windbreaks are used for different purposes; momo- and polyvalent types are used for farms, fields, animals and buildings. This manual tells how to choose the proper type of tree, and how to space and plant them.

PB-294 297/7 PC A16/MF A01
Department of Agriculture, Washington, DC.
Manuel de Conservation du Sol (Soil Conservation Manual)
1950, 369p
Text in French.

Keywords: *Soil erosion, Agriculture, Soil conservation, Developing countries, Manuals, Classifications, Forest land, Erosion control, Roads, Terracing, Cultivation, Grassland, Irrigation, Developing country application.

All aspects of soil conservation are thoroughly analyzed and explained in this report. Specific topics covered include: Classification of soils; prevention and rectification of ravines; the role of sylviculture; erosion around roadways; terracing; crop rotation and alternation; cover crops; harvesting methods; methods for creating, managing, conserving and improving pasturages; conservation of wildlife to prevent erosion; increasing water reserves; irrigation; and nurseries.

PB-294 309/0 PC A03/MF A01
PADCO, Inc., Washington, DC.
Guidelines for Formulating Projects to Benefit the Urban Poor in the Developing Countries. Volume I: Background, Goals and Project Opportunities
Apr 76, 47p
Contract AID/ta-C-1107
See also PB-294 310/6

Keywords: *Employment, *Socioeconomic status, Developing countries, Urban areas, Low income groups, Urban development, Population growth, Population migration, Unemployment, Urban planning, Services, Households, Consumption, Assets, Credit, Demographic surveys, Unskilled workers, Economic analysis, Fiscal policies, Poverty programs, Poverty research, Developing country application.

Volume I reviews the scale of the urban poverty problem, identifies varieties and underlying causes of urban poverty and indicates the goals presumed for the undertaking of projects to benefit the urban poor.

PB-294 310/8 PC A17/MF A01
PADCO, Inc., Washington, DC.
Guidelines for Formulating Projects to Benefit the Urban Poor in the Developing Countries. Volume II: Guidelines for Project Selection, Summary Project Characteristics and Case Studies
Apr 76, 396p
Contract AID/ta-C-1107
See also PB-204 309/0

Keywords: *Employment, *Housing, Developing countries, Urban areas, Low income groups, Urban development, Productivity, Finance, Urban planning, Services, Housing planning, *Transportation, *Education, *Health, *Water supply, Water treatment, Economic impact, Social effect, Land use, Poverty Programs, Poverty research, Developing country application.

Volume II identifies the role of projects in each sector in economic and social development together with the policy implications of such projects, describes the characteristics of projects likely to have high beneficial impact on urban poverty groups in the developing countries, identifies the other types of impact they are likely to involve and indicates complementary actions which may be necessary in undertaking them. Subject areas include: employment and productivity; water supply and sanitation; urban health services; urban education; housing; urban transportation; and urban management and finance.

PB-294 311/6 PC A03/MF A01
Ministry of Education and Culture, Rio de Janeiro (Brazil).
LeCaste-Croute Scolaire (School Lunch Booklet)
1963, 48p
Text in French.

Keywords: *Food services, Food preparation, *Children, Students, Schools, Financing, Nutrition, *Brazil, Food preservation, Distribution, Control, Developing country application, School lunch program.

Basic information on how to start a school lunch program in a school to guarantee children at least one balanced meal a day is provided by this book, written for the Brazilian school system. The program's purpose is explained, and details are given for understanding basic nutrition; food preparation; financing the program; personnel installations, and material needed; food preservation; preparing menus; distribution and control; and signs of undernourishment.

PB-294 312/4 PC A02/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Establishing Savings and Loan Associations in Less Industrialized Countries
Ideas and methods exchange
Roy J. Burroughs. Mar 67, 16p Rept no. IME-38

Keywords: Banks(Buildings), Developing countries, *Banking, Housing planning, Savings, Capital, Investments, Housing surveys, Operating costs, Interest, Budgeting, Savings and loan associations, Financial services, Developing country application, Loans, Mortgages.

The paper is for use in countries participating in the technical cooperation program. It is intended to describe the methods now used to establish savings and loan institutions in the United States.

PB-294 344/7 PC A10/MF A01
American Water Works Association, New York.
Distribution des Eaux: Les Relations Publiques (Silent Service Is Not Enough)
Technical series rept. no. 4.
1964, 206p
Text in French.

Keywords: *Water supply, Public relations, Water distribution, Manuals, Water services, Publicity, Industrial relations, Education, Management, Developing country application.

This is the fourth of four books explaining how to run a water distribution system. Public relations is a key aspect of the overall system. The importance of it is explained and the best methods of establishing and maintaining good public relations is discussed including: Creating a public relations awareness in your employees; strengthening bonds with the agents of other public services; teaching about the water service in schools; using publicity to make words and actions known; using publicity agents; and the necessity of making a water service interesting and attractive.

PB-294 366/0 PC A08/MF A01
Children's Bureau, Washington, DC.
Puericuiture: Votre Enfant de Un a Six Ans (Your Child from One to Six)
1978, 155p Rept no. PUB-30-1962
Text in French.

Keywords: *Children, Infants, Infectious diseases, Preventive medicine, *Health care delivery, Developing country application, Health care, Child rearing.

This is the third of a series of three books on child rearing. In simple language, understandable to any basic French reader, practical information is given regarding the normal medical and psychological problems normally encountered when raising young children, including emergencies. A special chapter is devoted to special problems due to changing residence, hospital stays, and handicaps. A chart of the symptoms, incubation period, methods of prevention, duration, and treatment of more and less common contagious diseases is included.

PB-294 410/6 PC A05/MF A01
Agricultural Research Service, Washington, DC.
The Potato Industry in East Pakistan. Improving Seed Potato Multiplication and Storage
D. G. Dalrymple, and R. V. Akeley. May 68, 98p

Keywords: *Potatoes, *Agricultural economics, *Pakistan, Yield, Production, Horticulture, Fertilizers, *Bangladesh, Seeds, Imports, Food storage, Demand(Economics), Plant diseases, Viruses, Prices, Marketing, Nutrition, Food consumption, Developing country application.

Although the potato has been commercially cultivated for centuries in Europe and North America, it is evidently rather new to East Pakistan. One report indicates that it was first produced around 1930. Since then, production has expanded substantially and potatoes are now easily the most important vegetable crop. Present production and marketing methods will be discussed in the first part of this report. One of the major production problems faced in East Pakistan--and other tropical areas--is the difficulty of building up and maintaining good stock. This is, in part, traceable to the heavy year-round insect populations which spread potato viruses. A special problem in East Pakistan is related to topography: the country is almost entirely a low-lying delta and there is essentially no high land suitable for more conventional breeding and multiplication programs. One answer is to import new seed varieties each season. This process, however, takes scarce foreign exchange. A compromise method would be to import a limited amount of seed, multiply it, and then store it for distribution to farmers the following season. The latter method has been proposed for East Pakistan and is discussed in detail in the second portion of this report.

PB-294 411/4 PC A04/MF A01
Economic Research Service, Washington, DC.
Leaf Protein Concentrate (PRO-XAN) from Alfalfa: An Economic Evaluation
Agricultural economic rept.
C. J. Vosloh, Jr, R. H. Edwards, and R. V. Enochian. Sep 76, 59p Rept no. USDA/AER-346

Keywords: *Proteins, Feeding stuffs, *Agricultural economics, Economic analysis, Operating costs, Plant tissues, Extraction, Labor estimates, Equipment, Investments, Industrial plants, Distillation, Pro-Xan process, Alfalfa, Developing country application, Wet methods.

Extraction of leaf protein concentrate (Pro-Xan) from alfalfa for use in various livestock feeds provides new investment opportunities under a wide variety of conditions. This report evaluates four systems for making this extraction and the effect of four variables on the annual rate of return on investment. The four systems differ in the method of expressing juice from the fresh alfalfa and the yield of Pro-Xan. The system in which the alfalfa is ground prior to pressing, and which has a Pro-Xan yield of 12 percent, had the highest rate of return on investment. The four variables evaluated were the method of utilizing the press cake remaining after the Pro-Xan containing juice is expressed, the method of disposition of alfalfa solubles remaining after the Pro-Xan is recovered from the juice, the length of operating season, and the size of the processing plant. The most profitable method of solubles disposition is dependent upon the feasibility of disposing of them in a nearby irrigation system, the price that can be obtained for them when concentrated for use as a feed ingredient, and the price of natural gas.

PB-294 412/2 PC A04/MF A01
Economic Research Service, Washington, DC.
Recycling Poultry Waste as Feed. Will It Pay
Agricultural economic rept.
Mar 74, 59p Rept no. USDA/AER-254

Keywords: *Waste recycling, *Animal wastes, Agricultural wastes, *Poultry, Water pollution abatement, Agricultural economics. Circulation, Feasibility, Drying, Feeding stuffs, Lagoons(Ponds), Aerobic processes, Composts, Oxidation, Cost estimates, Processing, Fertilizers, Incinerators, Developing country application, Recycling, Manure, Land application.

The recycling of dried layer waste (DLW) as feed to livestock and poultry is examined in considerable detail, but less information is available on recycling broiler waste. The cost of pollution abatement associated with alternative poultry-waste management systems is also analyzed. The cost of producing 1 ton of DLW is $25, $30, and $46 for flock sizes of 80,000, 50,000 and 10,000 cage layers, respectively. Using available drying systems, on farm processing and feeding of DLW do not appear to be economically feasible for the family-size (10,000 layer) operation. However, processing and feeding DLW may be feasible for the larger operations. The highest net returns are attained by the larger operations when DLW is fed at 12.5 percent of the ration. Cost analyses of the alternative methods of waste abatement show land disposal and anaerobic lagoon treatment to be the least expensive. Mechanical drying, aerobic lagoon treatment, oxidation ditch treatment, and combined anerobic-aerobic lagoon treatment fall within the intermediate cost range. Composting and incineration are the most expensive.

PB-294 413/0 PC A06/MF A01
Indian Inst. of Science, Bangalore. Dept. of Aeronautical Engineering.
A Low-Cost Water Pumping Windmill Using a Sail Type Savonius Rotor
S. P. Govinda Raju, and R. Narasimha. Jan 79, 110p
Rept no. 79/FM/2

Keywords: *Wind energy, Windmills, Pumps, Wind power generation, Rotors, Developing countries, Structural design, Rural areas, Developing country application, Savonius rotors, *Water pumps.

A water pumping windmill which can be built largely using materials and skills available in rural areas has been designed and fabricated. The windmill uses a Savonius rotor and incorporates a novel sail type construction. The pump is of positive displacement type using the casing of a pneumatic tire for the pumping chamber. Two prototypes have been constructed and these have indicated a reasonable performance and reliability.

PB-294 414/8 PC A02/MF A01
Nigerian Society of Agricultural Engineers, Zaria.
Impact of Industrial Development on the Quality of the Environment
B. Z. Diamant. Aug 78, 18p
Conference Proceedings of the Nigerian Society of Agricultural Engineers (2nd), Zaria, August 28-31, 1978.

Keywords: *Health, *Environmental impacts, Developing countries, Environmental surveys, Industrial hygiene, Public health, Industrial plants, Water pollution, Air pollution, Urban planning, Housing, Disease vectors, Developing country application, Solid wastes.

This document is a report presented to the second annual conference of the Nigerian Society of Agricultural Engineers, in Zaria, August 28-31, 1978. The purpose of this paper is to point out the mutual relationship that exists between industry and health, and the careful attention that has to be given to the health aspects while planning an industrialization program. The factors discussed in the paper are: water, air pollution, solid waste, town planning, vector control, housing, and industrial hygiene.

PB-294 415/5 PC A06/MF A01
Small Business Administration, Washington, DC.
Creer et Gerer une Petite Entreprise de Construction (Starting and Managing a Small Building Business)
John R. Immer. 1962, 113p
Text in French.

Keywords: *Management planning, Businesses, Management, Investments, Financial management, Sales, Publicity, Industrial relations, Financing, Land use, Inventory control, Commercial law, Construction, *Small businesses, Business administration, Developing country application.

Everything a new entrepreneur needs to know about starting a business is thoroughly covered in the handbook. Some of the topics covered include business structure, risks, capital management, mortgages, credit sources, business law, permits, building codes, insurance, employee relations, stock management, publicity and advertising, sales, business documentation for management, building plans and construction, preventing and meeting problems that cause delays, examples of several construction business failures and successes, amassing capital, future planning, land purchase and management, land subdivision and parcelling, and transportation. A special section is devoted to sources of further information.

PB-294 417/1 PC A02/MF A01
National Inst. of Foundry and Forge Technology, Ranchi (India).
Fluoride Process - A Sodium Silicate Bonded Self-Hardening Sand System Using a Fluoride Hardener
Interim rept.
P. L. Jain, and P. K. Panda. 22 Mar 79, 10p

Keywords: Foundry sands, Binders(Materials), Sodium silicates, Fluorides, Hardeners, Additives, Processing, Molds, Cores, Casting, Cost analysis, *India, *Foundries, Developing country application, Foreign technology.

Investigations have been carried out at NIFFT to develop a self-hardening sand system using sodium silicate binder and an inorganic fluoride hardener. The results obtained indicate a distinct possibility of using this process in preference to other inorganic or organic no-bake processes. The dimensional accuracy and casting finish obtained on the castings with this process are easily comparable to that obtained by other self hardening processes. The bench life, strength, and other sand characteristics are quite favorable and the breakdown properties are much better than in case of CO2 process. The process is also more economical than other organic and inorganic no-bake or self hardening processes, and can be quite suitable for the production of both moulds and cores for ferrous and non-ferrous castings.

PB-294 419/7 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Les Fibres Vegetales et Leurs Utilisations (Vegetable Fibers and Their Uses)
1966, 37p
Text in French.

Keywords: *Fibers, Plant fibers, Processing, Leaf fibers, Cotton plants, Bamboo, Reeds(Plants), Spinning(Staple fibers), Weaving, Ramie, Manila hemp, Sisal, Extraction, *Textile industry, Spinning frames, Developing country application, Villages.

The paper summarizes the processing and use of vegetable fibers with special emphasis on the development of this industry in the small-scale industrial sector in various countries. Covered are several subjects relative to vegetable fibers from the processing to manufacturing phases, including the equipment to be used at several stages, until the final product is obtained.

PB-294 420/5 PC A03/MF A01
International Cooperation Administration, Washington, DC. Office of Industrial Resources.
Vegetable Fibers and Their Uses
Industry series.
1966, 26p Rept no. COTTAGE INDUSTRIES BULL-5

Keywords: Plant fibers, Processing, *Fibers, Developing countries, Leaf fibers, Cotton plants, Bamboo, Reeds(Plants), Spinning(Staple fibers), Weaving, Technical assistance, Far East, Asia, Tools, Machinery, Ramie, Manila hemp, Sisal, Extraction, *Textile industry, Spinning frames, Developing country application, Villages.

The paper summarizes the processing and use of vegetable fibers with special emphasis on the development of this industry in the small-scale industrial sector in various countries. Covered are several subjects relative to vegetable fibers from the processing to manufacturing phases, including the equipment to be used at several stages, until the final product is obtained.

PB-294 421/3 PC A03/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Education by Alternation
Gerardo Angel Bacalini. 1979, 29p
International Seminar on Appropriate Technology in Education held in Bogota, Colombia on January 29-February 2, 1979. Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and COLCIENCIAS.

Keywords: *Education, Methodology, Meetings, Concepts, Learning, Social psychology, Objectives, Reasoning, Teaching methods, Training techniques, Developing country application.

Alternation is an educational system created in the rural areas of France which involves using alternating periods of physical activity with periods of study. The report discusses alternation and its origin.

PB-294 422/1 PC A02/MF A01
Ahmadu Bello Univ., Zaria (Nigeria). Dept. of Public Health Engineering. B. Z. Diamant - Author.
Environmental Engineering Control of Bilharzia in the Middle East
c1977, 9p

Keywords: *Middle East, *Schistosomiasis, *Diseases, Disease vectors, Control, Snails, Preventive medicine, Invertebrates, Trematoda, Worms, Infectious diseases, Parasitic diseases, Chronic diseases, Developing country application, Disease control.

Bilharzia is a chronic insideous disease which affects over 200 million people in 71 countries. This publication discusses the schistosomiasis disease, bilharzia, including the cycle of bilharzia; vector control methods; the snail habitat; and effective environmental snail control methods. A list of references is also provided.

PB-294 423/9 PC A19/MF A01
Monsanto Research Corp., Dayton, OH. Dayton Lab.
Development of Low-Cost Roofing from Indigenous Materials in Developing Nations
Final rept. 18 May 73-31 Dec 77
George L. Ball, Ival O. Salyer, Dennis W. Werkmeister, R. A. Cass, and Arthur M. Usmani. 20 Feb 78, 434p Rept no. MRC-DA-751
Contract AID/CM/ta-C-73-12

Keywords: *Building materials, *Housing, Roofing, Developing countries, Composite materials, Fibers, Bagasse, Binders(Materials), Rubber fibers, Thermoplastic resins, Fabrication, Compression molding, Cost estimates, Philippines, Jamaica, Ghana, Developing country application.

This document covers a four-year research program to develop low-cost roofing from indigenous materials in three developing nations (Philippines, Jamaica, and Ghana). In Phase I, resources were surveyed, and collaborating individuals and organizations defined. In Phase II, experimental roofing composite materials systems were developed and optimized. In Phase III, demonstrations of the roofing manufacture were conducted and experimental roofs installed. Four composite panel roofing material systems were developed which use major percentages of indigenous bagasse filler, and minor mounds amounts of phenolic or other resin binder. Three of the four processes use an intensive (Banbury) mixer. All four have compression molding as a final process step in panel fabrication. The products range in raw material cost from 6-14 cents per square foot of roofing panel, depending on composition, resin content, etc. The program was implemented in the three participating countries through advisory committees and technical working groups. Local labor, materials, and facilities were used to demonstrate manufacture of roofing by one or more of the processes.

PB-294 424/7 PC A04/MF A01
Agency for International Development, Washington, DC. Office of Science and Technology.
Expatriate Professionals as International Consultants
Joseph E. Stepanek, and Ming Ivory. Feb 79, 73p

Keywords: Professional personnel, Consultants, Developing countries, Population migration, Manpower utilization, Consulting services, Expenses, *Technical assistance, Resource allocation, Organizations, Administrative support, Scientific societies, Grants, Foreign nationals, Brain drain, Human resources, Developing country application.

The permanent migration of professionals to the more developed from the less developed regions of the world, in recent years referred to as the 'brain drain', is a problem of growing concern to all countries. The report reviews the major findings of selected studies undertaken during the last decade on the brain drain in order to assist the design of an action program. The report does not attempt an analysis of the brain drain problem but concentrates on one practical way of addressing it through a program which facilitates the return of expatriate professionals, residing in the United States, for relatively short periods as volunteer consultants to their countries of origin. The operational and financial implications of an expanding action program have been presented with suggestions for cost sharing.

PB-294 425/4 PC A03/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Cellandria Environmental Education Project
Gladis A. Bottaro Marques. 1979, 27p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and COLCIENCIAS. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Keywords: *Education, Schools, Instructional materials, Disadvantaged groups, Communities, Adults, Children, Learning, Citizen participation, Developing country application.

The report is based on the belief that by strengthening the role of education the school will be able to function as a center of resources for the whole community and it will aid the social and educational rehabilitation of neighborhoods. The objectives in the project were to get the community to really participate in the development of their town, make their habitat less aggressive, and achieve a true community relationship. Emphasized in the project were the two technologies considered appropriate for education: (1) open curriculum, and (2) the audio-visual teaching project for educational communication. An analysis of the experiences of the project is included in the document.

PB-294 426/2 PC A03/MF A01
Ministry of Education and Culture, Rio de Janeiro (Brazil).
Cartilla de Desayunos Escolares (School Lunch Program)
1963, 50p
Text in Spanish.

Keywords: *Food services, *Brazil, Schools, *Children, Nutrition, Nutritional deficiency diseases, Food dispensing, Food preparation, Food services management, Developing countries, Technical assistance, School lunch program, Developing country application.

Basic information on how to start a school lunch program in a school to guarantee children at least one balanced meal a day is provided by this book, written for the Brazilian school system. The program's purpose is explained, and details are given for understanding basic nutrition; food preparation; financing the program; personnel, installations, and material needed; food preservation; preparing menus; distribution and control; and signs of undernourishment.

PB-294 427/0 PC A04/MF A01
Tennessee Valley Authority, Muscle Shoals, AL.
Caracteristicas de la Industria Mundial del Abono - Fertilizantes Fosfatados (Characteristics of the World Fertilizers Industry - Phosphatic Fertilizers)
Travis P. Hignett. Dec 67, 74p Rept no. AVT/S-422
Text in Spanish.

Keywords: *Phosphates, Phosphorus, *Fertilizers, Developing countries, Production, Inorganic phosphates, Phosphoric acid, Magnesium, Nitrogen, Tables(Data), Developing country application.

A revision of the estimated world fertilizer (phosphate) production capacity as related to the future needs in developing nations, and the evaluation of the availabil-

ity of raw materials necessary to manufacture phosphate fertilizer. Extensive chemical equations, diagrams, tables and charts on acid phosphates (superphosphate), mineral phosphates, nitro phosphates, magnesium phosphates and related information are included along with an extensive bibliography.

PB-294 430/4 PC A02/MF A01
Ahmadu Bello Univ., Zaria (Nigeria).
Combined Vector Control Problems with Contradicting Host Habitats
B. Z. Diamant. cJan 76, 6p

Keywords: *Diseases, Disoase vectors, Pest control, Epidemiology, Etiology, *Malaria, *Schistosomiasis, Methodology, Reprints, Onchocerciasis, Developing country application, Hosts(Biology).

The paper deals with the specific problem of three vector-borne diseases--malaria, schistosomiasis, and onchocerciasis existing endemically in a tropical developing country. The suggested solution for an environmental control system the Automatic Spillway Syphon, is described in this article. A reference list is included.

PB-294 446/0 PC A04/MF A01
Agency for International Development, Washington, DC.
Raising Rabbits in the Tropics
Charles H. Coleman. Jun 65, 62p

Keywords: *Animal husbandry, *Rabbits, Developing countries, Manuals, Tropical regions, Selection, Buildings, Equipment, Breeding, Feeding stuffs, Animal diseases, Management, Developing country application.

This booklet is intended for the householder who wishes to procure a more nutritious diet for his family at a minimum of cost rather than for an individual who wishes to go into the commercial production of rabbit meat. Since most publications deal with raising rabbits in temperate, highly developed countries, the author has compiled this publication specifically for small-scale production in the tropics using the most economical methods possible.

PB-294 447/8 PC A03/MF A01
Agency for International Development, Washington, DC.
Une Methode Logique d'Elevage Avicole (The Poultry Result Demonstration)
David B. Mella, Haroldo Vasconcellos, and Frank E. Moore. 1978, 31p
Text in French.

Keywords: *Poultry, Developing countries, Poultry equipment, Buildings, Production, Manuals, Developing country application.

To raise poultry successfully, two conditions are essential; first, a certain degree of comfort must be given to the poultry of all ages and stages of productive life, and second, a practical form of management and system of raising the poultry must be followed. This book presents a demonstration of how to bring about these essential conditions as well as other factors which improve poultry farm productivity.

PB-294 448/6 PC A05/MF A01
American Water Works Association, New York.
Distribution des Eaux: Les Computeurs D'Eau (Water Meters)
1964, 91p
Text in French.

Keywords: *Water supply, Water distribution, Water meters, Distribution systems, Installing, Tests, Maintenance, Efficiency, Developing country application.

This is the second of four books on water distribution systems. It covers the choice, installation, testing, and maintenance of water meters. Proper use to maximize efficiency and the best methods of maintaining records is also mentioned.

PB-294 449/4 PC A11/MF A01
American Water Works Association, New York.
Distribution des Eaux: La Gestion des Services (A Training Course in Water Utility Management)
1964, 240p
Text in French.

Keywords: *Water supply, Water distribution, Water services, Public utilities, Developing countries, Fire protection, Civil defense, Expenses, Accounting, Management, Public relations, Licenses, Developing country application.

This is the third of a series of four books devoted to provision of a water distribution system in developing countries. This volume covers the following aspects of the system's management: Ownership and control of services; obligations of the service; fire protection; civil defense; water rights; authorizations and permits; regulation of the service; financing of private and public water services, scales of charges; accounting; administration; engineering and engineers; norms; care and maintenance of equipment and installations; insurance; personnel; structuring the work force; security; public relations; and annual reports. A check list for employees is included.

PB-294 494/0 PC A03/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Appropriate Technology: Concept, Application and Strategies
Bertha Salinas. 1979, 27p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and COLCIENCIAS. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Keywords: *Technology transfer, Technical assistance, *Education, Developing countries, Technology, Improvement, Planning, Community development, Rural areas, Research, Industries, Agriculture, Appropriate technology, Developing country application, Villages.

The areas discussed in the paper are: (1) The characteristics of appropriate technology; (2) Appropriate technology and political projects; (3) Fields of application and methodology; and (4) International and regional strategies to support appropriate technology. A reference list is included.

PB-294 528/5 PC A10/MF A01
India Planning Commission, New Delhi. Management and Administration Div.
Planning and Scheduling with Network Technique (PERT/CPM) (Programme Evaluation and Review Technique/Critical Path Method)
Aug 66, 224p

Keywords: *Management techniques, Network analysis(Management), Critical path method, PERT, Management methods, Industrial management, Project management, Scheduling, India, Developing country application.

Discussed in this manual is a specific application of the PERT and critical path networking techniques to Indian conditions.

PB-294 546/7 PC A02/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Irrigation in Bangladesh
Stephen D. Biggs, Chris Edwards, and Jon Griffiths. Feb 78, 24p

Keywords: *Irrigation, Developing countries, *Bangladesh, Government policies, Rural areas, Manpower, Pumping, Water wells, Ground water, Irrigated land, Water supply, Planning, Employment, Pakistan, Developing country application.

This paper summarizes a longer paper on irrigation in Bangladesh. It suggests that the development of irrigation is a precondition for a significant increase in agricultural output and employment. With scarcely any uncultivated land, higher food output can only come through widespread irrigation, which is applied to a mere 12% of cultivated land; and a more intensive use of land is essential if unemployment and under-employment in Bangladesh is not to further increase as one million additional workers each year look for jobs.

PB-294 547/5 PC A03/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
An Introduction to the Health Planning and Budgeting Systems in India
Discussion paper
Andrew Barnett. Dec 77, 34p Rept no. IDS/DP-121
Also pub. as ISSN-0308-5864.

Keywords: *India, Budgeting, Foreign countries, Expenses, Data sources, Statistical data, Developing country application, *Health planning, Government.

Indian Government health expenditures have rarely been analyzed in published material- this omission is rapidly forming yet another constraint to change at a time when the whole Indian health care system is being questioned. This paper provides a guide to sources of material on health planning and budgeting in India and an initial analysis of government health expenditure on the basis of the data publicly available up to June 1976.

PB-294 548/3 PC A03/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Water to the Fields: Institutional Innovations in India's Command Area Development Programme
Discussion paper
Robert Wade. Aug 75, 34p Rept no. IDS/DP-79
Also pub. as ISSN-0308-5864.

Keywords: *Irrigation, *India, Organizations, Irrigation canals, Boundaries, Government policies, Water loss, Efficiency, Water distribution, Developing country application, Institutional framework.

Irrigation development is now receiving high priority in India's agricultural development strategy. This paper describes what is being done to effect a number of major institutional changes in canal-irrigated areas, such as realignment of property boundaries, introduction of rotational irrigation, and formation of water users' associations. The paper argues that research on institutional aspects of water distribution, of which there has so far been remarkably little, is needed not only for understanding the distribution of income and power in rural society, but also for the formation of policies which might make that distribution less unequal.

PB-294 549/1 PC A02/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Towards Rural Futures: An Approach Through the Planning of Technologies
Discussion paper
Robert Chambers. Jun 78, 24p Rept no. IDS/DP-134
Also pub. as ISSN-0308-5864.

Keywords: *Regional planning, Research, Technology, Developing countries, Economic development, Utilization, Rural sociology, Research management, Planning, Benefits, Expenses, Environments, Research and development, Developing country application, Rural population.

The report discusses the potential of technological research and development for creating rural futures in third world countries, especially in South Asia and Africa. Against the background of forces which deepen and extend rural poverty, it suggests that new technology can either impoverish or, through imaginative R and D, may have a countervailing effect on the forces which tend to impoverish. It reviews some current approaches and then speculates on some gaps which they sometimes leave; R and D on R and D itself; learning from and working with rural people; environment-specificity; a future-orientation. It outlines criteria and a method of planning for identifying desirable new technology and lists types of environment for which the method might be useful.

PB-294 555/0 PC A03/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Nutrition and National Development Planning
Discussion paper
J. L. Joy, and P. R. Payne. Oct 75, 40p Rept no. IDS/DP-83
Also pub. as ISSN-0308-5864.

Keywords: Nutrition, Nutritional deficiency diseases, Food, Development, Planning, Requirements, Assessments, Developing country application, *Health planning.

Three papers are included in this document and constitute an attempt to define the position of food and nutrition issues in the context of development planning. They take as their starting point the proposition that the primary objective of development planning should be the reduction of deprivation. The areas discussed in the documents are: (1) the nature and range of the choices open to planners confronting the problem of nutrition deprivation and the kind of information needed for effective decision making; (2) the role of the nutritionist in relation to the planner and the politician; (3) the organization of the planning process.

PB-294 568/1 PC A13/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Health Needs and Health Services in Rural Ghana. Volume 1
Jun 78, 296p

Keywords: Developing countries, Assessments, Rural areas, Africa, Disadvantaged groups, Diagnosis, Preventive medicine, Evaluation, Public health, Participation, Recommendations, *Health care delivery, *Health manpower, *Ghana, Developing country application, Health care requirements, Health care services, Health services research, Rural health services, Primary health care, Health resources.

This volume reports on research aimed to illuminate three main areas in the health sector: the development of health service appropriate to the needs of the disadvantaged groups in developing countries, particularly in the rural areas; community organization for health activities; and aid in the health sector. The research was approached through an interdisciplinary perspective.

PB-294 569/9 PC A10/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Health Needs and Health Services in Rural Ghana. Volume II: Appendices
Aug 78, 212p

Keywords: *Health care delivery, Developing countries, Rural areas, Africa, Disadvantaged groups, *Ghana, Preventive medicine, Evaluation, Public health, Participation, Recommendations, Criteria, Effectiveness, Populations, Sanitation, Nutrition, Children, Allocations, Health care requirements, Ghana, Developing country application, Health care services, Primary health care, Health manpower education, Health resources, *Health manpower.

This document contains eighteen appendices to complement Volume I. The topics covered in the appendices are: primary health care tasks; observation schedules; criteria of effectiveness; a typology of the villagers' options for health care; range of services provided; population coverage; polyclinic care; environmental sanitation; child nutrition; patterns of resource allocation; assessment of physical resources; assessment of manpower resources; health workers' training; community resources in health care; organizational assessment; and villages studied.

PB-294 570/7 PC A02/MF A01
Gandhian Inst. of Studies, Varanasi (India). Appropriate Technology Development Unit.
Appropriate Technology for a New System of Education
M. M. Hoda. 1979, 13p
Presented at International Seminar on Appropriate Technology in Education, Held at Bogota, Columbia on January 29-February 2, 1979. Sponsored in part by United Nations Education, Scientific and Cultural Organization, New York., and COLCIENCIAS.

Keywords: *Education, Technology assessment, Developing countries, Regional planning, Citizen participation, Economic development, Educational sociology, Rural sociology, Meetings, India, Educational technology, Teaching methods, Developing country application.

A plan and organization for a new system of education is proposed in this paper. It is an appropriate technology for education because it emphasizes acquiring skills and arts in the fields of village activities from the beginning. The purpose of this education would be to make its recipient a useful member of the community who should be able to enrich the environment to which he belongs.

PB-294 571/5 PC A02/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
New School Project
Vicky Colbert de Arboleda, and Oscar Mogollon.
1979, 20p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and COLCIENCIAS. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Keywords: *Education, Developing countries, Project planning, Schools, Requirements, Rural areas, Students, Disadvantaged groups, Developing country applications.

Contained in this document are three parts. The first part describes a series of problems that characterize education in developing countries. The second part consists of a description of the New School Project with the principal components, methods, mechanisms, and expected results of the implementation. The third part analyzes how the New School Project constitutes as an alternative that responds to the educational needs more characterized in the underdeveloped nations, in accordance with the aspects in the first part.

PB-294 572/3 PC A04/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Appropriate Education and Its Correlative Technology
Jairo Arboleda Toro. 1979, 67p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and and COLCIENCIAS. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Keywords: *Education, Technology assessment, Developing countries, Regional planning, Economic development, Educational sociology, Rural sociology, Meetings, Citizen participation, Educational technology, Developing country application, Teaching methods.

The general areas discussed include: (1) the validity of the concept of 'appropriate technology in education'; (2) its function in underdeveloped countries; (3) the areas that such a concept includes; and (4) the possibilities for international, regional or subregional action strategies originating from an appropriate technology in education.

PB-294 573/1 PC A03/MF A01
Harvard Univ., Cambridge, MA. Center for International Affairs.
Economic Man and Engineering Man: Choice of Technology in a Low Wage Country
Louis T. Wells, Jr. Nov 72, 41p Rept no. ECONOMIC DEVELOPMENT-226

Keywords: *Technology assessment, Production methods, Developing countries, Production engineering, Decision making, Manufacturing, Production management, Fixed investment, Capital, Economic factors, Automation, Labor estimates, Manpower utilization, Engineering technology, Developing country application.

The study probes the complex factors that influence the manager in his choice of production techniques. The managers choice of technology appears to be influenced by two objective functions which are discussed; that of the 'economic man' to minimize cost, and the 'engineering man', which leads toward a more sophisticated, automated technology.

PB-294 574/9 PC A03/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
An Experiment in the Use of the Low-Cost Teaching Materials-Packaging Useful to Schools Campaign
Jose Francisco Nereu. 1979, 33p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York, and COLCIENCIAS. Proceedings of the International Seminar on Appropriate Technology in Education, Bogota, Colombia, January 29-February 2, 1979.

Keywords: *Education, Instructional materials, Developing countries, Foreign countries, Instructors, Schools, Students, Publicity, Product development, Learning, Developing country application.

The main purpose of this paper is to show how the packages of the most popular consumer goods may be used as teaching materials. Described is the experiment conducted in Portugal between October 1974 and February 1977 and sponsored by the Ministry of Education and Scientific Research, General Office for Basic Education.

PB-294 575/6 PC A05/MF A01
Agency for International Development, Manila (Philippines).
Time Series Analysis Handbook
Kenneth F. Smith. Oct 75, 91p

Keywords: *Management techniques, Time series analysis, Periodic variations, Seasonal variations, Trends, Variations, Planning, Philippines, Irregularities, Long term effects, Developing country application.

Four principles of time series analysis are described in this handbook. They include: long term trends; cyclical variation; seasonal variation; and erratic or unpredictable variation. The booklet is a how-to guide for managers in evaluating existing programs and for forecasting purposes.

PB-294 576/4 PC A03/MF A01
Vanderbilt Univ., Nashville, TN. Graduate School of Management.
A Program for Achieving Better Project Management in Developing Countries
Morris Solomon. 18 Sep 74, 36p
Contract AID/csd-3156

Keywords: Project management, Developing countries, *Management training, Organization theory, Industrial training, Personnel development, Supervision, Management methods, Instructional materials, *Training, Skill development, Developing country application.

The paper outlines a world strategy for upgrading the project management capability of the developing countries, with particular attention to training. The strategy calls for: indigenous interdisciplinary training teams for each interested country; training with organizational focus; work on actual projects as a part of training; continuing participation of top management of organizations that are targeted; support of selected national training teams by regional centers of excellence; use of learning packages as a basis for training; a learning stance by trainers; and adaptation of learning packages to local needs and conditions.

PB-294 599/6 PC A08/MF A01
Swedish International Development Authority, Stockholm.
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand. India on November 20-30, 1978. Forest Industry Policy and Choice of Appropriate Technology
Background paper
R. H. Carlsson, D. G. Denoual, M. Hallberg, and E. Rheman. 28 Sep 78, 164p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products. Sponsored in part by the United Nations Industrial Development Organization, Vienna (Austria).

Keywords: *Paper, *Pulp, Government policies, Industries, *Forestry, Developing countries, Wood products, Conflicts, Paper industry, Wood pulp, Exports, Constraints, Management, Decision making, Market research, Production, Regulations, Salaries, Sweden, Canada, Developing country application.

The purpose of this primarily methodological paper is to study the problem of how the government in a less developed country can influence the choice of appropriate technology in its forest products industry. The early experiences of Sweden and Canada are studies which might have some similarities with the development situations in LDC's. A second step in this paper is the study of the overall global structure of some subsectors of the forest products industry.

PB-294 600/2 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for a Low-Cost Paper Project to Boost the Rural Economy
Background paper
T. Jeyasingam. Sep 78, 39p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: Manufacturing, Corrugating, Boxes(Containers), Developing countries, Economic development, Rural areas, Technology innovation, Production methods, Paper industry, Project management, Raw materials, Pollution, Pulp additives, *Agricultural wastes, Paperboards, *Industrial plants, *Paper, *Pulp, *Containers, *Waste recycling, Research and development, Developing country application.

A project to manufacture liner board and corrugating medium to produce corrugated box containers has been identified as essential to boost the rural economy of developing countries. The appropriate technology for this industry is based on the use of agricultural residues for pulp production, the use of less steam, water and energy for processing, simple process techniques suitable for ease of operation and maintenance, flexibility of operational systems and reduction of pollution load. As this project is based on agricultural residues, it will have far reaching socio-economic benefits to the rural communities of developing countries.

PB-294 601/0 PC A02/MF A01
Food and Agricultural Organization of the United Nations, Rome (Italy). Advisory Committee on Pulp and Paper.
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Prospects for Establishing Viable Small-Scale Pulp and Paper Industries in Developing Countries
Background paper.
Sep 78, 15p
Sponsored in part by United National Industrial Development Organization, Vienna (Austria). Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: Paper industry, Pulp mills, Developing countries, *Paper, *Pulp, Wood pulp, Production methods, Pulping, Equipment, Economic development, Environments, Papermaking, Pollution, Economic analysis, Energy, Developing country application.

Paper is such an important commodity in the development process that developing countries naturally want to establish their own paper industry to satisfy their own need and so reduce their dependency on outside supplies. The report discusses the basic problem areas encountered in creating a paper industry for developing countries.

PB-294 602/8 PC A12/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Rural Energy Supply in Developing Countries
Background paper
T. Turner. Oct 78, 269p
Report of Working Group No. 11, Appropriate Technology for Rural Energy.
See also PB-298 839/2

Keywords: *Wind energy, *Bioconversion, Rural areas, Developing countries, Fossil fuels, *Solar energy, Wind power generation, *Electric power, Forestry, *Hydroelectric power, Anaerobic processes, Policies, Planning, Social effect, Financing, Technology, Cost estimates, Recommendations, Energy supplies, Developing country application, *Energy source development, Renewable energy sources, Technology transfer.

This survey attempts to describe trends in the search for appropriate energy technologies and situate the issues of energy supply for integrated rural development in an institutional, and also within an international framework. Recommendations are given.

PB-294 606/9 PC A06/MF A01
Michigan State Univ., East Lansing.
Studying Agricultural Institutions. A Modular Approach
Summary rept.
Garland P. Wood. Jan 78, 113p
Contract AID/csd-3132

Keywords: *Agricultural economics, Developing countries, Organizations, Management, Objectives, Education, Project planning, Economic development, Attitudes, Questionnaires, *Costa Rica, Developing country application, Institutions.

This report details a model of how 'outsiders' can help public institutions become more effective in serving the economic development needs of the small farmer. Results of a partial test of this model in Costa Rica is also reported.

PB-294 619/2 PC A03/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Health Aid: A Comparative Study of Three Donor Countries
Alastair White, Emmanuel De Kadt, and Neil Anderson. Jan 79, 35p

Keywords: *Health care delivery, Developing countries, Comparison, Great Britain, Sweden, Netherlands, Foreign countries, Agencies, Developing country application, Voluntary organizations, Health programs.

The paper presents a summary of the finds of the IDS health research group's analysis of the aid given in the field of health by the governments and by the voluntary agencies of Britain, Sweden, and the Netherlands. The problems addressed here are the forms of health programs most urgently needed in developing countries and how programs should be ranked in terms of their usefulness.

PB-294 621/8 PC A05/MF A01
National Industrial Development Corp. Ltd., New Delhi (India).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Evaluation of Appropriate Technology for Textile Production in a Developing Country
Background paper.
Sep 78, 80p
Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria). Report of Working Group No. 3, Appropriate Technology for the Production of Textiles.

Keywords: *Textile industry, India, Textile processes, Developing countries, Cotton fibers, Synthetic fibers, Spinning(Staple fibers), Fabrics, Textile finishing, Technical assistance, Clothing, Appropriate technology, Developing country application.

The textile industry is one of the earliest industries to occur in many developing countries. This paper attempts to analyze the relevance to developing countries of alternative technologies available for different stages of textile manufacture. The scope is restricted to the main apparel fibres cotton and manmade fibres. The discussion is primarily based on the profile of textile manufacture in India, where a wide range of technologies and scale of operations exist side by side.

PB-294 622/6 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Role of National Institutions and Raw Materials Problems in Building Materials Industries
Background paper
N. R. Hill. Oct 78, 24p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: *Building materials, Construction materials, Technology assessment, Developing countries, Raw materials, Industries, Production planning, Industrial training, Laboratories, Appropriate technology, Developing country application.

A common problem affecting the development of building materials and construction in developing countries is the lack of adequate expertise and laboratory facilities for the evaluation of suitable deposits of raw materials. This paper stresses the responsibility that rests with governments to ensure that trained staff and adequate central surveying and testing facilities are available.

PB-294 624/2 PC A02/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
Primary Health Care and the Role of Foreign Aid
Susan Cole King. Jan 79, 24p

Keywords: Foreign aid, Developing countries, Implementation, *Health care delivery, Developing country application, Health care requirements, Health status, Primary health care, Health programs.

The paper discusses the basic health needs and the most important factors contributing to improvement in health status. The principles of basic health needs is summarized in Part I. Part II discusses the operational problems of implementing primary health care programs. Part III outlines the forms of aid required to address these operational problems and discusses the implications for donors' internal organizations and procedures, which at present constitute constraints to assisting programs which aim to meet basic health needs.

PB-294 636/6 PC A03/MF A01
International Inst. of Tropical Agriculture, Ibadan (Nigeria).
Engineering for Appropriate Technology Farming Systems in the Lowland Humid Tropics
Farming systems program
Ray Wijewardene. 1977, 41p
Report for 1977 of the Agricultural Engineering Sub-Program Crop Engineering Department.

Keywords: Tropical regions, *Agricultural machinery, Developing countries, Hand tools, Plows, Tractors, Planting, Harvesting, Pest control, Cultivation, Developing country application.

The subject of this document is alternate methodology which is low in energy and time and is appropriate to the environment. It is directed at the small and intermediate farmer in the humid tropics and discusses the development of tools which will enable them to adopt 'no till' or 'minimum tillage' techniques. The areas of research discussed include tools for weed control, tools for planting, tools for harvesting, and equipment for transportation. Tables for comparison of manpower requirements and productivity are included.

PB-294 637/4 PC A02/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Non-Formal Education Ecuador's Experience. International Seminary on Appropriate Technology in Education, Held at Bogota, Colombia, on January 29-February 2, 1979
Patricio Barriga, and Enrique Tasiguano. 1979, 20p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, Paris (France), COLCIENCIAS.

Keywords: *Education, Ecuador, Developing countries, Learning, Theaters, Radio communication, Informal organization, Visual aids, Developing country application.

The report discusses non-formal education as a sound effort in the search for alternatives for the population that lacks access to school education. The processes used in this experiment in non-formal education are described. They are: educational games, theater, illustrated novels, poster and radio. A bibliography is included.

PB-294 638/2 PC A02/MF A01
International Inst. of Tropical Agriculture, Ibadan (Nigeria).
Farming Systems Engineering - Summary of Projects for the 1975 'In-House-Review'
Farming systems program.
Ray Wijewardene. Jan 76, 22p

Keywords: Planting, *Agricultural machinery, Sprayers, Hand tools, Design, Spraying, Tractors, Tropical regions, Developing country application.

This document is an illustrated r[illegible] the design and development of implements and t[illegible] to complement the new systems of farming being developed primarily for use by small farmers in the low-land, humid tropics and capable of indigenous manufacture. The topics covered are: weed control techniques, planting/fertilizer placement, harvesting, power tiller, land development and irrigation engineering.

PB-294 640/8 PC A02/MF A01
International Inst. of Tropical Agriculture, Ibadan (Nigeria).
Systems and Energy in Tropical Farming
Ray Wijewardene. 1978, 18p ASAE/TP-78/1511
Proceedings of the American Society of Agricultural Engineers, Palmer House Hotel, Chicago, Illinois, December 18-20, 1978.

Keywords: Agriculture, *Agricultural machinery, Nigeria, Tropical regions, Farms, Climate, Planting, Cultivation, Hand tools, Manpower, Fertilizers, Tractors, Constraints, Operations, Developing country application.

This report endeavors to analyze the constraints both environmental and physical to the productivity of the small farmer in the humid tropics. Discussed is the development and adaptation of tools to translate the most recent appropriate techniques applicable to the small farmer. Included are illustrations and a reference list.

PB-294 644/0 PC A05/MF A01
Agency for International Development, Washington, DC.
Survey of the State of Appropriate Technology in El Salvador
James S. Monachino. Nov 78, 98p

Keywords: *El Salvador, Developing countries, Technical assistance, Houses, Agriculture, Rural areas, Technology, *Regional planning, *Industrial development, Appropriate technology, Agency for International Development, Developing country application.

The purpose of the report was to survey the general state of appropriate technology which exists in El Salvador and to offer viable recommendations which could be utilized by the USAID/El Salvador Mission. The emphasis of this investigation was directed toward the rural residents and those institutions that interact with them.

PB-294 645/7 PC A03/MF A01
International Inst. of Tropical Agriculture, Ibadan (Nigeria).
Engineering for Appropriate Technology Farming Systems in the Lowland Humid Tropics
Farming systems program
Ray Wijewardene. 1976, 28p
Report for 1976 of the Agricultural Engineering Sub-Program Crop Engineering Department.

Keywords: *Agricultural machinery, Tropical regions, Planting, Harvesters, Plows, Tractors, Weed control, Production, Rice plants, Corn plants, Design, Developing country application, Small farms.

The development of energy reducing systems for crop production, and the appropriate tool technology to complement them, requires an appreciation for the range of crops being grown within each of these zones; cultural practices most appropriate to a sustained agriculture; water regime likely to be available; and the methods of weed control which might appropriately be applied. Illustrated and discussed in this report are the tools developed for increased crop production in the humid-tropics. They include: hand-held planters, propelled planters, a controlled droplet application agrochemical applicator, a hand maize sheller, a stripper harvester for rice and similar cereal crops, strip tillage, and mechanized cassava lifting. Tables are given for comparison of methods and productivity.

PB-294 658/0 PC A02/MF A01
Albany County Planning Board, NY.
Energy Report: Heat Transfer Principles
Technical memo (Final).
May 78, 12p Rept no. TM/EC-1
Contract HUD-D-11467, Grant HUD-CPA-NY-1164

Keywords: *Heat transfer, Conduction, Convection, Thermal diffusion, Evaporation, Condensing, Books, Education, Developing country application, Greenhouse effect.

This pamphlet is a primer on the basics of heat transfer and related physical principles with a bibliography of primary sources.

PB-294 659/8 PC A03/MF A01
Albany County Planning Board, NY.
Energy Report: Climate, Wind and Heat Loss
Technical memo (Final).
May 78, 26p Rept no. TM/EC-2
Contract HUD-D-11467, Grant HUD-CPA-NY-1164

Keywords: *Buildings, Heat loss, Climate, Wind(Meteorology), Preferred orientation, Positioning, Position(Location), *Energy conservation, Developing country application.

This report focuses on climate and wind as they effect heat loss in structures, and recommends building orientation and wind control mechanisms which can be employed to mitigate these effects. A bibliography of primary sources is provided.

PB-294 660/6 PC A02/MF A01
Albany County Planning Board, NY.
Energy Report: Conductance, Resistance and Recommended Standards
Technical memo (Final).
May 78, 19p Rept no. TM/EC-3
Contract HUD-D-11467, Grant HUD-CPA-NY-1164

Keywords: *Heat transfer, Heat transmission, *Buildings, Conductivity, Thermal resistance, Heat loss, Condensing, Temperature control, Houses, Standards, *Energy conservation, Developing country application, Life-cycle cost, Mobile homes.

This energy conservation report deals with calculations of a structure's conductivity and resistance, and delineates a method for calculating the cost of fuel used over the life of mechanical equipment and construction materials. It also presents minimum energy conservation standards for one, two, and multi-family residential construction.

PB-294 [illegible]71/3 PC A04/MF A01
Connecticut Univ., Storrs. Inst. of Public Service.
How to Conduct a Survey
Myron E. Weiner. 1964, 55p

Keywords: *Management techniques, Surveys, Instructional materials, Objectives, Methodology.

Provided in this book is a step-by-step approach in conducting a survey using the molecular concept. Case studies are given using the molecular concept.

PB-294 677/0 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Production of Sugar and Other Sweetening Agents
Background paper.
27 Sep 78, 34p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar.

Keywords: *Sugar, Production, Technical assistance, Food processing, Developing countries, Manufacturing, Methodology, Technology, Sugar crops, Tropical regions, Foreign countries, India, Appropriate technology, Developing country application.

Different technologies for the production of various sweetening agents such as gur, khandsari sugar, plantation white sugar, raw-sugar, refined sugar, etc. are described in detail in this paper. The quality of the products is specified. The cane, financial and technical skill requirements for various technologies are outlined. The parameters required for adoption of one technology or the other are indicated. It is pointed out that the vacuum pan technology for producing plantation white sugar is the cheapest and is ideally suited for developing countries.

PB-294 683/8 PC A04/MF A01
National Industrial Development Corp. Ltd., New Delhi (India).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Rural Industry
Background paper
Sep 78, 58p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops. Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria).

Keywords: Industries, Rural areas, Economic development, Technology assessment, Industrial plants, Incentives, Organizations, Financing, Personnel development, Meetings, India, *Industrial development, Rural economics, Developing country application, *Small businesses.

The first section defines what rural industry is and establishes rationale for such industries. The second section deals with development of small and rural industries in India--the place of small and rural industries in industrial sector, facilities and incentives for their development, present status, appropriate technologies, impediments to growth and India's experience. The third and the last section deals with the identification of major problems of appropriate technologies in the small and rural industries sector and the contributions which international organizations could make in overcoming such problems.

PB-294 705/9 PC A02/MF A01
International Ozone Association.
Recent Development in the Role of Ozone in Water Purification and Its Implications in Developing Countries
B. Z. Diamant. 1978, 25p
Proceedings of a Workshop on Marine and Freshwater Ozone Applications (2nd) Held by the International Ozone Association in Orlando, Florida, November 1-3, 1978.

Keywords: *Water treatment, Ozonation, Halogen organic compounds, Chlorine organic compounds, Disinfectants, Potable water, Oxidation, Economic analysis, Developing country application.

The recent discoveries of halo-organic carcinogens in water supplies have highlighted the long-existing, most suitable replacement to the hazardous chlorine--the gas ozone. This paper discusses the development of ozone in water purification as it relates to the developing countries. A reference list is included.

PB-294 706/7 PC A06/MF A01
Indian Drugs and Pharmaceuticals Ltd., New Delhi.
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in Drug and Pharmaceutical Industries
Background paper.
Oct 78, 123p
Sponsored in part by United Nations Industrial Development Organization, Vienna (Austria). Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Keywords: Technology assessment, *Drugs, Developing countries, Health, Medical services, Medical supplies, Marketing, Patents, Production methods, International trade, Government policies, Fixed investment, Capital, Pharmacology, Pharmacy, Industrial technology, Industrialization, Institutional role, Developing country application.

The report discusses the different aspects of the drugs and pharmaceuticals industry with particular reference to the drug needs in developing countries. There is no doubt that many developing countries have a long way to go in cultivating sophisticated technology in this field. However, the competence of various developing countries in adopting the production in the field of drugs and pharmaceuticals varies which is due not only to the different stages of educational development in general and of technological competence in particular, but also due to capital-intensive requirement of these industries. All the developing countries are in the process of reorganizing their health needs and today even the more developed among the developing countries are not prepared to provide medical needs to more than 20% of their population. It is fairly

necessary that each of the developing countries defines its scope of production and phases out the work to be undertaken in this direction with ability to expand this for future development.

PB-294 712/5 PC A05/MF A01
Agency for International Development, Manila (Philippines).
Statistical Survey and Analysis Handbook
Kenneth F. Smith. Mar 75, 78p

Keywords: *Management techniques, Surveys, Design, Methodology, Sampling, Statistical analysis, Instructional materials, Developing country application.

The book is a step-by-step illustrative guidebook emphasizing the principles and processes of scientific surveying. These include the fundamentals of survey design, statistical sampling procedures, analytical methodologies and presentation techniques. The steps described in detail include clarifying the purpose and defining the objectives; planning and organizing the survey; conducting the survey; evaluating the findings; and presenting the results.

PB-294 718/2 PC A04/MF A01
Japan Industrial Technology Association, Tokyo (Japan).
Introduction to National Technology
1977, 73p

Keywords: *Technology transfer, *Industrial development, Technological intelligence, Abstracts, Descriptions, Publicity, Research, Patents, Consulting services, Licenses, Industrial technology, Developing country application, Research and development, Scientific research.

The first part gives a list and abstracts of over a hundred national technologies possessed by the Ministry of International Trade and Industry (MITI). The second part is a country paper presented at a symposium on technology transfer in New Delhi, India in February, 1978. The third part is an index of technologies offered and technologies sought.

PB-294 758/8 PC A04/MF A01
Technology Consultancy Centre, Kumasi (Ghana).
Annual Review Number 4, 1975-76
J. W. Powell. 1976, 66p

Keywords: *Industrial development, Technological intelligence, Consulting services, Ghana, Economic development, Industries, Government policies, Expositions, Technical assistance, Construction, Production methods, Industrial technology, Developing country application.

The objective of Centre is to promote industrial development in Ghana. The report discusses the 3rd Ghana International Trade Fair; the consulting services for government departments and large industries; consulting services for small industries; and the production units on the university campus such as small bolt and broadloom weaving.

PB-294 759/6 PC A04/MF A01
Technology Consultancy Centre, Kumasi (Ghana).
Appropriate Technology in India. Report on a Study Leave, August-December, 1977
J. W. Powell 1977, 51p

Keywords: *Industrial development, Technology innovation, Rural areas, *India, *Nepal, Industries, Economic development, Engineering, Textile process, Cements, Manufacturing, Crafts, Solar energy, Sugars, Soaps, Vegetable oils, Papermaking, Woodworking, Methane, Ecology, Industrial technology, Rural population, Rural development, Developing country application.

The booklet is a study of small scale industries in India and Nepal and of the efforts being made to develop appropriate technologies for the establishment of decentralized industries in rural areas. It is an easy reference for specialists who may be interested in one or two technologies. Emphasis has been placed upon the advantages of each technology and the opportunities for its application with special reference to the problems of the rural poor. The topics covered are: textiles; engineering; cement making; craft industries; chemical processes; renewable energy; ecology; and non-mechanized transport.

PB-294 760/4 PC A04/MF A01
Technology Consultancy Centre, Kumasi (Ghana).
Annual Review Number 3, 1974-75
J. W. Powell. 1975, 57p

Keywords: *Industrial development, Technology, Consulting services, Technical assistance, Economic development, Rural areas, Industries, Government, Finance, Ghana, Product development, Construction, Production management, Handicrafts, Developing country application.

The booklet is the annual review of the Technology Consultancy Centre of the University of Science and Technology in Ghana. The report discusses the Centre's role in the stimulation of grass-roots development by means of appropriate technology. The areas covered include: craft village projects; rural industries; consulting services for small industries; consulting services for ministries and government departments; and production units on the university campus.

PB-294 761/2 PC A04/MF A01
Technology Consultancy Centre, Kumasi (Ghana).
Annual Review Number 5, 1976-77
J. W. Powell. 1977, 57p

Keywords: Technology, *Industrial development, Consulting services, Technical assistance, Economic development, Rural areas, Industries, Ghana, Product development, Industrial plants, Project management, Personnel selection, Financing, Handicrafts, Developing country application.

The review includes individual project reports on the soap pilot plant; the promotion of the rural industries of Ashanti; metal products design unit; and the handloom weaving unit. The appointment of a core staff of research fellows to the Technology Consultancy Centre and the involvement of social scientists in the work projects are new developments which are discussed.

PB-294 762/0 PC A03/MF A01
Technology Consultancy Centre, Kumasi (Ghana).
Case Study Number 1 - Lab. Products Ltd. A Case History of an Attempt to Use Institutional Support to Create Independent Commercial Manufacturing in Ghana
F. W. Lukey. Aug 78, 34p

Keywords: *Industrial development, Technology innovation, Manufacturing, *Ghana, Universities, Technological intelligence, Commerce, Consulting services, Financial management, Metal products, Production engineering, Personnel selection, Profits, Exports, Imports, Supplies, Case studies, Developing country application.

The report includes the following topics: Origin of the industry; Financial policy; Performance in financial terms; Foreign exchange and import licenses; Customers; Personnel; Production efficiency; and Supplies.

PB-294 842/0 PC A12/MF A01
Sussex Univ., Brighton (England). Inst. of Development Studies.
The Prevention of Farm-Level Food Grain Storage Losses in India: A Social Cost-Benefit Analysis
R. A. Boxwell, M. Greeley, D. S. Tyagi, M. Lipton, and J. Neelakanta. 1977, 252p

Keywords: *Grains(Food), *Food storage, *India, Benefit cost analysis, Project planning, Improvement, Farms, Losses, Platforms, Bins, Asperigillus, Fungi, Metals, Damage, Rodents, Fumigation, Ethylene, Bromides, Chlorides, Developing country application.

The object of this document is to provide a social cost-benefit analysis of farm-level storage improvements in Andhra Pradesh. The major crop studied was paddy, and following a pilot project the main project team worked from 1974 to 1976 in six districts of Andhra Pradesh, with a base at the Indian Grain Storage Institute, Bapatla, Guntur District. The following areas are discussed in this report: The sample and measurement of losses; the present pattern of storage; the structure and pattern of storage; and social cost-benefit analysis of farm-level storage improvements programs. References, tables, and photographs are included.

PB-294 896/6 PC A11/MF A01
California Fertilizer Association, Sacramento. Soil Improvement Committee.
Manuel sur l'Emploi des Engrais (Western Fertilizer Handbook)
c1953, 231p
Text in French. Library of Congress catalog card no. 75-14776.

Keywords: *Fertilizers, Manuals, Handbooks, Chemical properties, Soil fertility, Plant growth, Plant nutrition, Irrigation, Salinity, Soil tests, Storage, Developing country application.

Fertilizer is becoming increasingly important in modern agriculture, especially with the advent of high protein plants of the green revolution. This book divides the study of fertilizers into the following basic components: the soil; water; acid, salt, and alkaline soils; organic materials; chemical and organic fertilizers; how a plant functions; plant nutrition; tests to determine problems in the soil; commercial fertilizers to correct soil conditions causing problems as determined by the above tests; transport and application of dry and liquid fertilizers; and proper use and storage of fertilizers and pesticides with special dangerous properties.

PB-294 897/4 PC A03/MF A01
Kansas State Univ., Manhattan.
L'Etude des Insectes (4-H Entomology Manual)
Dell E. Gates, and Wayne J. Colberg. 1978, 46p
Text in French.

Keywords: *Insects, Entomology, Manuals, Taxonomy, Reproduction(Biology), Arthropoda, Invertebrates, Identifying, Breeding, Developing country application.

Basic knowledge of entomology is necessary to protect beneficial species and to destroy harmful ones. This manual explains the place of insects in the animal kingdom, defines the phylum, and explains the biology of insects. Methods of collecting, mounting, and labelling insects are explained as well as protecting collected specimens and breeding. Additional chapters are devoted to the orders of insects, identifying them, and preparing demonstrations and documentation.

PB-294 898/2 PC A05/MF A01
Forest Service, Washington, DC.
L'Exploitation Forestiere (Logging Farm Wood Crops)
Fred C. Simmons. 1967, 94p
Text in French.

Keywords: *Forestry, Lumbering, Manuals, Hand tools, Saws, Cutting tools, Chisels, Tractors, Materials handling equipment, Storage, Roads, Maintenance, Transportation, Developing country application.

Logging operations can add to a small farmer's income. This manual explains how best to exploit one's forest resources. Covered are wheeled and tracked tractors and horses and mules for hauling; equipment (axes, saws, turning bills, strippers, levers, and protective covers); chain saws, circular saws, and other special tools, making and maintaining forest roads; storing and seasoning wood; marking and marketing; felling and cutting up trees; and loading and transport.

PB-294 899/0 PC A03/MF A01
Lutheran World Relief, Niamey (Niger).
Puisard Maraicher en Beton (Concrete Marsh Wells for Irrigation)
Gary Ellerts, and David Ingold. 1978, 46p
Text in French.

Keywords: *Water wells, *Irrigation, Developing countries, Marshes, Concrete structures, Construction materials, Diagrams, Water table, Construction, Developing country application.

In marshy land it is difficult to dig a well or sunken draining trap of more than 40cm without the surrounding area caving in, resulting in loss of much cultivable land area. This system of construction is applicable only where the water table is less than 8 meters, a large number of wells are needed, financial means are limited, unsupervised labor is available, and cement is available at a reasonable price. Used properly it can

greatly improve land use in regions like parts of the Sahel, where this system was developed.

PB-294 900/6 PC A04/MF A01
Forest Service, Washington, DC.
Les Termites Ravageurs du Batiment (Control of Nonsubterranean Termites and Subterranean Termites)
R. A. St. George, H. R. Johnston, R. J. Kowal, and Thomas E. Snyder. 1967, 66p
Text in French.

Keywords: *Wood, *Insects, Termites, *Pest control, Manuals, Pesticides, Life cycles, Construction, Sanitation, Foundations, Insecticides, Developing country application.

Termites leave telltale signs of their presence. This booklet describes those signs and outlines methods of preventing termite infestation through proper methods of construction allowing for raised platforms, ventilation, and chemical treatment of wood. The life cycle and colony development of termites is explained, and structural, chemical and sanitary measures to save an infested building are discussed. A short section on other wood eating insects is included.

PB-294 901/4 PC A25/MF A01
Connecticut Univ., Storrs. Inst. of Public Service.
Preparing, Evaluating, and Managing Development Projects
Lawrence J. Sespaniak, Morris J. Solomon, and John H. Bragg. May 73, 583p
Prepared in cooperation with Massachusetts Univ., Amherst, and Ife Univ. (Nigeria). Inst. of Administration.

Keywords: Project planning, Project management, Economic development, Developing countries, Professional personnel, Government policies, Manuals, Decision making, Investments, Capital, Cash flow, Economic analysis, Value, Benefit cost analysis, *Agricultural economics, *Management planning, Social services, Yield, Prices, Group dynamics, Administrative principles, Case studies; Developing country application

The purpose of the manual is to provide a methodology for developing projects at the ministerial level by both professional and administrative personnel. Major considerations involved in analyzing projects are described. They include: modules for analysis; datasheets and worksheets; schedules, cash flows, and difference flows; evaluating cash flows of a project; and human relations implications for project analysis. Several projects which are described are castor seed, agricultural, social, and a village health center. An international bibliography is included. Appendices outline compound interest and present value tables; sources of statistical data; steps in developing enterprise budgets and their interpretation; and project studies by participants.

PB-294 904/8 PC A03/MF A01
Agency for International Development, Washington, DC. Office of Institutional Development.
L'Amenagement d'un Poulailler Familial (Poultry Unit for Family and 4-S)
David B. Mellor, Haroldo Vasconcellos, and Frank E. Moore. 1960, 34p
Text in French.

Keywords: *Animal husbandry, *Poultry, Manuals, Buildings, Tropical regions, Financing, Developing country application.

All the structures necessary for the raising of poultry in the tropics are described in this pamphlet. Notes on the care of the animals are also provided, and charts on the material needs and financial arrangements of several experimental farms are included.

PB-294 984/0 PC A11/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
The Technological Knowledge Base for Industrializing Countries; Proceedings of the NBS/AID UNCSTD (United Nations Conference on Science and Technology for Development) Seminar Held at Gaithersburg, Maryland on October 16-17, 1976
Final rept.
Raymond C. Sangster. Apr 79, 241p* Rept no. NBS-SP-543
Grant PASA-TA(CE)-6-71
Sponsored in part by U.S. Coordinator for the UN Conference on Science and Technology for Development. Library of Congress catalog card no. 79-600058.

Keywords: Technological intelligence, *Information services, Industries, Meetings, Measurement, Developing countries, Quality control, Production management, Technology assessment, Health, Safety, Performance standards, Utilization, International law, Management analysis, Data base administration, Industrial technology, Commercial development, Developed nations.

The report contains the proceedings of a seminar held on the topic of establishing a technological knowledge base for industrializing countries. The areas of interest discussed are: Measurement capabilities and services required by technological industry; National and international standards required by industrializing nations; Acquisition of commercial industrial technology; and Industrial quality control.

PB-295 041/8 PC A03/MF A01
National Engineering Lab. (NBS), Washington, DC. Center for Building Technology.
Protecting Adobe Walls from Ground Water
Final rept.
James F. Clifron, and Frankie Davis. Mar 79, 29p
Rept no. NBSIR-79-1730
Sponsored in part by National Park Service, Washington, DC.

Keywords: Walls, Clays, Fluid infiltration, Permeability, *Ground water, Grout, Membranes, Drainage, *Adobe.

Two methods for creating impervious membranes in existing adobe walls were investigated. They were the injection of chemical grouts and installation of a metallic membrane. Chemical grouting was unsuccessful because of the low permeability of the tested adobe materials. The metallic membrane did prevent the migration of moisture in the adobe underneath the membrane, weakening the adobe. Further, soluble salts migrated to the surface of the wet adobe. Alternative methods for protecting adobe structures from ground water and runoff water are discussed, including the installation of effective drainage systems and upgrading the foundations.

PB-295 065/7 PC A02/MF A01
Sheaffer and Roland, Inc., Chicago, IL.
Energy Recovery from Manure Using Plug-Flow Digesters
John H. Martin, and Gene Dale. Dec 78, 9p ASAE/TP-78/4568

Keywords: *Agricultural wastes, *Methane, Anaerobic processes, pH, Stability, Management planning, Feedlot wastes, Michigan, Wisconsin, *Bioconversion, *Waste recycling, *Manures, Solid wastes, Synthetic fuels, Manufactured gas, Developing country application.

Two anaerobic digesters have been treating cow manure in Michigan and in Wisconsin for a few years. Both of them employ plug-flow, contrasted with stirred-pot, management of the manure and operate at mesophilic temperatures. They exhibit very high stability and good methane yield at feeding rates in excess of 10 Kg of volatile solids per day per cubic meter of digester volume (0.8 lb/cu ft/day). Dispersion occurs in the velocity of the material passing through the digester so that large pieces pass much more slowly than the hydraulic velocity. Odors in the effluent disappear when hydraulic detention times are as long as 4 days. From measurements of energy content, the biogas is about 60 percent methane. The pH of the digester is between 7.0 and 7.2 under most steady feeding conditions. Under transient feeding conditions it may range from 6.8 to 7.8.

PB-295 087/1 PC A06/MF A01
Civil Engineering Lab. (Navy), Port Hueneme, CA.
Calefaccion de Edificos y Agua Caliente para Uso Domestico Mediante Energia Solar (Solar Heating of Building and Domestic Hot Water)
Final rept. Jul 74-Dec 75
E. J. Beck, Jr, and R. L. Field. Jan 76, 121p
Text in Spanish.

Keywords: Insolation, Heat storage, *Solar water heating, Architecture, Design, Cost analysis, *Solar heating systems, Solar water heaters, Solar collectors.

This report provides guidance in the design and cost analysis of solar heating systems for buildings and domestic hot water (DHW). The nature of solar radiation, several types of solar systems, storage devices, and architectural considerations are among topics included. Calculation methods are included for determining collector size, storage size, simplified building and DHW loads, value of fuel saved, and saving-investment ratios. Eleven worksheets are used to enable the engineer with no prior experience with solar systems to accomplish a complete design and cost analysis. With this information he can prepare bidding and specification documents for the job. Tables of solar insolation at various Navy stations, typical building heat loads, collector prices by type, and storage tank prices are included. Two example problems are worked for tube-in-sheet collectors: one for space and DHW heating for a single dwelling; the other DHW supply for a dispensary.

PB-295 179-T PC A02/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Experiences of Community Participation in Non-Scholarized Initial Education in the Department of Puno - Peru
Walker Chalco. 1979, 20p
International Seminar on Appropriate Technologies in Education, held at Bogota, Colombia, on January 29-February 2, 1979. Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York.

Keywords: *Education, *Peru, Developing countries, Rural areas, Schools, Children, Attitudes, Roles(Behavior), Developing country application.

The paper describes a project undertaken to help the rural population in Puno, Peru to develop by supplying the maximum educational opportunities needed to satisfy the minimum essential needs to learn and for integral development of the largest number of peasant children under the age of six. The project is based on community participation as the community organizes itself to assume responsibility with the government for solving their different problems.

PB-295 196/0 PC A02/MF A01
Soil Conservation Service, Washington, DC.
Catfish Farming
Roy A. Grizzell, Jr, Olan W. Dillon, Jr, Edward G. Sullivan, and Lawrence V. Compton. Nov 75, 25p
Rept nos. FARMERS/BULL-2260, FB-2260

Keywords: Catfishes, Aquaculture, Ponds, Containers, Water supply, Water quality, Eggs, Feeding stuffs, Proteins, Oxygen, Temperature, Turbidity, Animal diseases, Parasites, Harvesting, Cost analysis, *Fishes, Developing country application, Fishkills, Predators.

Catfish farming is using water areas to produce crops of catfish by intensive management. This kind of farming requires constructing facilities; controlling water quality; spawning, hatching, and feeding fish; and harvesting and marketing the fish crop. A fish farmer can grow catfish in ponds, raceways, or cages. This bulletin discusses the production of channel catfish, blue catfish and white catfish. They are suited to warm-water culture where water temperatures are above 70 degrees F for at least 4 months each year. All are native to America and have a good conversion ratio of feed to meat.

PB-295 216/6 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Animal-Drawn Agricultural Implements, Hand-Operated Machines and Simple Power Equipment in the Least Developed and Other Developing Countries; Report of a Manufacturing Development Clinic Held at New Delhi, India on 21-30 October 1974
1974, 46p
Ministry of Agriculture, New Delhi (India).

Keywords: Manufacturing, *Agricultural machinery, Developing countries, Hand tools, Plows, Design, Proposals, Investments, Feasibility, Maintenance, Harvesters, Tractors, Disks(Agricultural), Technology transfer, India, *Animal energy, Developing country application.

The Manufacturing Development Clinic on Animal-Drawn Agricultural Implements, Hand-Operated Machines and Simple Power Equipment in the Least Developed and Other Developing Countries was held at New Delhi from 21 to 30 October 1974. The Clinic was organized jointly by the United National Industrial Development Organization (UNIDO) and the Ministry of Agriculture, Government of India, as one of several projects to be undertaken jointly. The general objective of the Clinic was to explore ways and means to promote the local manufacture of appropriate agricultural machinery in the least developed and other developing countries of the world.

PB-295 218/2 PC A02/MF A01
Mindanao State Univ., Marawi City (Philippines).
Experiments in Rearing 'Siganus guttatus' (Places: Osteichthyes, Siganidae) in a Sea-Cage and Fishpen in the Philippines
Abduraji S. Tahil. Dec 78, 20p

Keywords: Marine fishes, Aquaculture, *Philippines, Feeding stuffs, Growth, Weight(Mass), Salinity, Temperature, Mortality, *Fishes, Foreign technology, Developing country application, Signanus guttatus.

Two different groups of juvenile S. guttatus fed entirely with benthic algae were reared in two different culture structures. After 24 weeks of rearing, one group with a mean standard length of 7.89 cm and average weight of 15.49 g, upon being stocked in a sea-cage, increased in length to 10.31 cm and 33.56 g in weight. The other group, reared in a fishpen for the same number of weeks, increased in length from a mean of 7.68 to 10.42 cm and in weight from 15.47 to 34.47 g. There was no significant difference in growth. Mortalities of 15.8 percent and 13 percent were obtained in the cage and fishpen, respectively. Growth comparison showed that S. guttatus is slower in growing than the other species of siganids. Some advantages of rearing signnids in the fishpen are described and further improvements are discussed.

PB-295 235/6 PC A02/MF A01
Executive Office of the President, Washington, DC. Assistant to the President for Intergovernmental Affairs.
Rural Development Initiatives: Overcoming the Problems of Isolation: Improving Rural Communications
Feb 79, 16p

Keywords: Telecommunication, Rural areas, Regulations, Problem solving, Government policies, *Regional planning.

The report documents a series of rural communication initiatives undertaken to improve rural life and overcome the problems or rural isolation through modern communications technology. These initiatives include FCC regulatory changes, Rural Electrification Administration (REA) telephone loans, and grants by several Federal agencies. They are intended to encourage the use of modern communications systems in bringing health, education, information, and entertainment to rural areas.

PB-295 499/8 PC A12/MF A01
Denver Research Inst., CO. Office of International Programs.
The Past and Potential Role of the United States in the Transfer of Agri-Food Technology to Developing Countries
Final rept.
Theodore W. Schlie, Suellen Edwards, Floyd Shoemaker, Charles Slater, and Judson Harper. Mar 77, 273p NSF/PRA-7700892
Grant NSF-PRA77-00892
Sponsored in part by Department of State, Washington, DC. Prepared in cooperation with Colorado Univ., Boulder, and Colorado State Univ., Fort Collins.

Keywords: *Technology transfer, Developing countries, *Food, Nutrition, *United States, Agricultural products, Research, Technological intelligence, Technical assistance, Organizations, International relations, Agricultural economics, Industrial technology, Voluntary agencies, Research needs, Research and development, Private agencies, Agricultural production, Scientific research.

The report examines the processes of technology transfer with respect to food and nutrition in the United States and identifies the influencing factors of these processes. The results are useful in guiding technology transfer efforts from the United States to developing countries.

PB-295 565-T PC A14/MF A01
Department of Agriculture, Washington, DC.
Prostrate Summer Cypress and Its Culture in Kirghizia
G. A. Balyan. 1979, 305p Rept no. TT-77-59026

Keywords: Shrubs, Greases, *Arid land, Morphology, Taxonomy, Plant growth, Cultivation, Nutritive value, Sheep, Utilization, Seeds, Viability, Translations, USSR, *Plants(Botany), Foreign technology, Kochia prostrata.

Unlike cereals and legumes, cypress (Kochia prostrata) in arid regions does not dry up in summer and develops quite tender and highly-nutritious stems and leaves which are quite acceptable for sheep, horses and camels in all seasons of the year. The present book includes the methods of preservation of seed viability, biology, introduction, cultivation and utilization of cypress, as well as valuable recommendations regarding its culture in different conditions.

PB-295 621/7 PC A07/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Management Div.
Understanding Your Cooperatives
Cooperative Information rept. (Final)
C. H. Kirkman, Jr. Mar 79, 149p Rept no. CI 6

Keywords: Cooperation, Agricultural economics, Organizations, Government policies, History, Organization theory, Financing, Taxes, Capital, Management, Marketing, *Agricultural cooperatives, Cooperatives, Cooperative production and marketing system, Administrator responsibility, Employee responsibility.

The report, prepared for postsecondary schools, serves as a teaching aid to improve student understanding of cooperatives operating in the community. Written in textbook fashion, the report covers topics such as principles and practices of cooperatives, historical cooperative developments, economic democracy in action, and principles underlying cooperative financing and taxation. The publication has illustrations for making overhead transparencies.

PB-295 644/9 PC A04/MF A01
Agency for International Development, Washington, DC.
Agricultural Development Policy Paper
Jun 78, 70p

Keywords: Food, *Agricultural economics, Developing countries, Policies, Project planning, Irrigation, Rural areas, Marketing, Credit, Nutrition, Income, Employment, Food storage, Production, Education, Developing country application, AID project.

This paper sets forth the major policy implications and issues for A.I.D. of a broadly participatory, employment-oriented agricultural production strategy for developing countries. The 'broadly participatory' strategy reflects the major U.S. development assistance objectives of helping developing countries: (1) Increase their capacity to expand and distribute food supplies to alleviate hunger and malnutrition, and (2) increase participation of poor people in the process and benefits of development. The strategy outlined in this paper suggests that improved diets in developing countries will in large measure depend on increasing food supplies mainly through accelerating agricultural production and improving food distribution, and expanding employment and income of low income families, thereby enabling them to purchase the food they need. It reviews the evolution of A.I.D. agriculture policy and stress the need for a restatement of policy based on a broadly participatory production strategy. It summarized the implications of the strategy and raises key issues in terms of five function priorities for assistance to agriculture.

PB-295 645/6 PC A03/MF A01
Columbia Univ., New York. Dept. of Chemical Engineering and Applied Chemistry.
Ethanolic Fuels from Renewable Resources in the Solar Age
Harry P. Gregor, and Thomas W. Jeffries. 1979, 34p

Keywords: *Ethanol, Fuels, Organic compounds, Cellulose, Membranes, *Agricultural wastes, *Sugar, Technology, Cost analysis, Fermentation, Process charting, Hydrolysis, Filtration, Reverse osmosis, Evaporation, *Waste recycling, *Bioconversion, Chemical feedstock, Solid wastes, Manufactured gas, Synthetic fuels, Developing country application.

This communication describes how ethanol, other liquid fuels, and organic chemicals can be produced from cellulosic biomass at prices that can compete with those of petroleum derived materials by employing presently available or soon to be developed membrane technologies. Contemporary membrance technologies can already effect major savings in process costs for the conventional fermentation of grains or molasses to produce ethanol; developing membrance technologies could employ cheap cellulosic substrates for ethanol production.

PB-295 654/8 PC A03/MF A01
U-Form Systems and Technology, Inc., Livonia, MI.
Design Properties, Structural Analysis and Construction Details for a Typical U-Form Wall System
c1978, 28p

Keywords: *Buildings, Construction materials, Compression tests, Wind pressure, Floors, Walls, Building codes, Foundations, Earthquake resistant structures, *Energy conservation, Developing country application, Shear walls, High rise buildings.

U-Form Systems and Technology, Inc. has developed an energy-efficient integrated building wall system called 'U-Form.' U-Forms serve as basic building for a low-cost, poured-in-place, reinforced concrete construction system combines structure, vapor barrier, superior thermal and sound insulation, fire retardance, and interior and exterior veneers. The system is applicable to sophisticated high-rise building and low-cost, low-rise buildings alike. Two 12 story apartment buildings of 116 units each were recently erected at the rate of two floors per week using only one six-man crew. U-Forms can be fabricated and erected with basically unskilled labor using a variety of local materials in low capital-investment situations. Hence, increasing applications are being found in urban renewal and in third world countries. (Copyright (c) 1978, U-Forms System & Technology, Inc.)

PB-295 655/5 PC A03/MF A01
Indiana Univ. at Bloomington, International Development Research Center.
Regional Agricultural Production Programs, Training and Design Strategies
Burton E. Swanson. 1976, 31p

Keywords: *Agriculture, Production, *Regional planning, *Education, Agricultural economics, Project planning, Rice, Research, Farm management, Rural extension, *Training, Teaching techniques, Developing country application.

The pamphlet presents a palpable portrait of certain real-world problems of institution building as an instrument of social and economic development, and of some practical responses to them. It presents case material about the training of research and extension workers in an international agricultural research center. It then examines key relationships between training and results--between the preparation of persons for developmental roles and eventual action in the field. The findings offer lessons for the design of certain kinds of agricultural production production programs, and for using training as one tool in such design.

PB-295 656/3 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Technologies from Developing Countries. Development and Transfer of Technology Series Number 7
1978, 50p

Keywords: Technology innovation, Developing countries, Technological intelligence, Plants(Botany), Animal products, Food industry, Wood products, Paper products, Pulps, Leather, Textile industry, Construction industry, Energy, Chemical industry, Plastics industry, Metal industry, Machinery, *Technology transfer, Foreign technology, Developing country application.

Developing countries have frequently expressed the need for information on technologies evolved or adapted by other developing countries. Such information will be of benefit to them in the appropriate choice of technologies by providing alternatives and also a basis for promoting the exchange of information and sharing of experiences in this field. As part of its information activities UNIDO has been collecting information on technologies from developing countries through contacts with institutions related to research and development and other sources of information in developing countries as well as through journals, reports and other publications dealing with such matters. This volume brings together in one place information on 138 technologies from developing countries. Generally, under each heading a brief description of the technology and its distinctive features are given.

PB-295 734/0 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC.
Cooperative Development in Rural Areas
Cooperative information rept.
Sep 78, 39p Rept no. CIR-1-SECT-4

Keywords: Agricultural economics, Agricultural machinery, Marketing, Farms, Income, Financing, Rural areas, Sugar beets, Swine, Tobacco, Vegetables, Fruits, Processing, Fishes, American Indians, Capital, *Agricultural cooperatives, Cooperatives.

Many conventional marketing and supply cooperatives have been formed by farmers in the past four decades. Cooperatives' membership consisted primarily of medium- and high-income farmers, although many also had a number of low-income farmers. Between 1957-75, 2,019 cooperatives were formed. New cooperatives formed by commercial farmers included sugar beet processing, tobacco marketing, peanut storage, and feeder pig marketing and farrowing. New cooperatives formed by low-resource farmers included marketing of fruits and vegetables, feeder pigs, and fish. In addition to providing historical and statistical background, this publication also provides information for organizing, financing, and managing cooperatives.

PB-295 806/4 PC A03/MF A01
Stanford Univ., CA. Inst. for Communication Research.
Radio's Role in Development: Five Strategies of Use
Information bulletin
Emile G. McAnany. Sep 73, 34p AED/CDC/IB-4

Keywords: Radio communication, Radio broadcasting, *Education, Rural areas, Utilization, Strategy, Developing country application.

The radio at the present time is man's most universal mass medium of communication. The author outlines five utilization strategies that could prove most useful to developing countries: Open Broadcasting, Instructional Radio, Radio Rural Forums, Radio Schools, and Radio and Animation.

PB-295 813/0 PC A02/MF A01
Los Alamos Scientific Lab., NM.
Passive Solar Systems Development
J. Douglas Balcomb. Sep 76, 15p
Sponsored in part by Energy Research and Development Administration, Washington, DC.

Keywords: Design, Reviewing, *Solar cooling systems, Passive solar heating systems, *Solar heating systems, Developing country application.

Definition of a passive solar heating and cooling system as one in which the thermal energy flows by natural means. This includes systems in which insulation for example, is moved by manual or electric means, once or twice a day. A sort of generic description of the various approaches to passive solar heating and cooling are illustrated with a few examples.

PB-295 814/8 PC A02/MF A01
Columbia Univ., New York. Dept. of Chemical Engineering and Applied Chemistry.
For Today: Membrane-Produced Gasahol. For Tomorrow: Membrane-Produced Alcohol
1979, 12p
Sponsored in part by Office of Minority Business Enterprise, Washington, DC.

Keywords: Sugars, *Fuels, *Ethanol, Graphs(Charts), Fermentation, Cellulose, *Alcohols, Grains(Cereals), Hydrolysis, Cost analysis, Electrodialysis, Membranes, Fluid filters, Osmosis, Biomass, Process charting, Design criteria, Cost analysis, *Bioconversion, Developing country application, *Gasohol, Reverse osmosis, Manufactured gas, Synthetic fuels, Ultrafiltration.

This pamphlet, shows in charts the following: (1) Conventional process for production of fuel-grade ethanol from sugars; (2) Alcohol from grain or molasses with membrane treatment of stillages; (3) Treatment costs for stillages; (4) Membrane-controlled fermentation of sugars to ethanol; (5) Membrane facilitated hydrolysis of cellulose.

PB-295 953/4 PC A09/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Community Health Education in Developing Countries
Program and training journal manual series.
c1978, 195p Rept no. MANUAL-SER-8
Prepared by American Public Health Association, Washington, DC. Contract PC-77-043-1020. Errata sheet inserted.

Keywords: Public health, Education, Developing countries, Community development, Project planning, Instructional materials, *Health education.

The pamphlet was developed for those persons, from whatever backgrounds, who are interested in promoting change to improve the health conditions of their communities. One may be a teacher, a community agriculture extension worker, a social worker or a well driller. The manual is a guide -- a working and teaching tool -- to help one get started on a community health project through health education. Health education is a process through which behavior changes are effected. Health problems are rooted in specific behaviors: changing those behaviors will change a community's health status.

PB-295 955/9 PC A08/MF A01
TRANET, Rangeley, ME.
The Relevance of AT (Appropriate Technology) Development in the U.S. to the Third World (A Compendium of U.S. A.T. Organizations)
Frederick W. Smith. 1979, 163p
Sponsored in part by Organization for Economic Co-Operation and Development, Paris (France)., and International Bank for Reconstruction and Development, Washington, DC.

Keywords: Organizations, Technology innovation, Developing countries, Directories, United States, Economic development, Technological intelligence, Low income groups, Problem solving, Research management, Technical assistance, Information centers, Technical societies, Consultants, Consulting services, *Appropriate technology, Research and development.

Development agencies such as the World Bank, O.E.C.D., A.I.D., and others are beginning to recognize the need for experts familiar with small scale, low-cost and easily maintained technologies and also techniques which involve low-income people in solving their own problems. The report explores crucial and important resources of AT developments within the United States, and is concerned with its impact on the lives of low-income people and its possible relevance to Third World development. The authors have tried to reach a broad representative range of AT practitioners, the persons actually designing and using alternate/appropriate techniques, rather than to select the most technically qualified.

PB-296 041/7 PC A18/MF A01
ACTION/Peace Corps, Washington, DC.
A Handbook for Cooperatives Fieldworkers in Developing Nations; Sections One through Seven
Information collection and exchange resource packet no. 5
Mark S. Ogden. 1978, 410p

Keywords: Developing countries, Organizing, Instructional materials, Farms, Handbooks, Financing, *Agricultural cooperatives, Developing country application, Volunteer programs, *Cooperatives.

Seven sections written by experienced volunteers include: an introductory section; cooperatives--general concepts; cooperative organization; cooperative management; cooperative education and training; specific program-related information; and resources.

PB-296 052/4 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Teaching Reading and Creative Writing: A Language Experience Approach
Program and training journal Reprint series
Margaret Hart. Sep 78, 106p Rept no. REPRINT SER-20

Keywords: Instructional materials, Reading, Writing, Developing countries, English language, Phonology, Linguistics, Handwriting, Books, Vocabulary, *Education.

The course of study was developed for five remedial reading classes of secondary school students. The basic method used here can be adapted for teaching reading and creative writing to students from the infant school level to adulthood. The vocabulary, or thought content of the material, will be relevant to the student because it comes from his own background of experience. The course of study consists of recording stories dictated by individuals, and using these stories as a basis for developing the required skills for reading, and creative writing.

PB-296 072-T PC A06/MF A01
National Marine Fisheries Series, Washington, DC.
Problems in Prawn Culture
Aquaculture series 19
Kunihiko Shigeno. c1978, 104p Rept no. TT-74-52032

Keywords: Shellfish, Aquaculture, Ponds, Larvae, Sea water, Books, Salt water, Reproduction(Biology), Growth, Packing, Cost analysis, Feeding stuffs, Production, Temperature, Mortality, Japan, Translations, *Fishes, Penaeus japonicus, Prawns, Foreign technology.

Japan is the leading producer of cultured prawns. The present book reviews the work done in Japan on prawn culture in abandoned salterns. The data obtained from Himejima farms, where prawns are grown in outdoor concrete tanks in unfiltered sea water, are the main source of the material for this book. The author discusses the salient features of seed production with great emphasis on the selection of gravid prawns, methods of hatching and growth of seedlings. Culture methods have been elaborated and valuable suggestions offered on all aspects of prawn culture.

PB-296 096/1 PC A03/MF A01
Institute of Medicine, Washington, DC.
Review of the Agency for International Development (AID) Health Strategy: A Committee Report
Final rept.
Sep 78, 38p Rept no. IOM-78-05
Contract AID/ta-C-1478

Keywords: Developing countries, Guidelines, Strategies, Nutrition, Sanitation, Tropical diseases, Research, Populations, Health care, Developing country application, Health planning, *Health care delivery, Environmental health, Family planning.

The report includes review and comment on two internal documents developed by AID to state its policy and program guidelines in health, population, and nutrition. The reviewing committee doubted the value of elaborate planning exercises in host countries, recommended a slow approach to integrated health services projects and warned against losing categorical programs, advised that family planning programs be more finely adjusted to the types of people for whom they are intended, urged that P.L. 480 programs be better coordinated with AID nutrition programs and that AID help establish and train for research capabilities in countries where nutrition research is needed, recommended that AID emphasize water and sanitation systems whose maintenance is appropriate to the technology of the country, and urged a high priority for tropical diseases research.

PB-296 362/7 PC A04/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.

Directory of Consultants to Small Rural Industries. Employment Generation Through Stimulation of Small Industries
Kay E. Auciello, and Richard Johnston. Oct 75, 52p

Keywords: Consultants, Consulting services, Directories, Agriculture, Developing countries, Economic development, Industries, Rural areas, Technical assistance, Management, Organizations, Job analysis, *Employment, Project management, Systems analysis, *Small Businesses, Job development, Developing country application.

The directory is the first attempt to compile a listing of experienced individuals and organizations currently interested and experienced in assisting, on a contract basis, the development of small rural industries in developing countries. For this purpose, small rural industries are defined as agro-industrial establishments of 20 or fewer employees and assistance as a system approach to aspects of technical and managerial assistance. The first section of directory lists organizations and the second section lists individuals. Each entry is arranged alphabetically by the country in which its headquarters are located.

PB-296 363/5 PC A02/MF A01
Bio-Gas of Colorado, Inc., Arvada.
Conversion of Feedlot Wastes into Pipeline Gas
Frederick T. Varani, and John J. Burford, Jr. 1979, 24p

Keywords: *Agricultural wastes, Anaerobic processes, *Methane, Pilot plants, Process charting, Design criteria, Performance evaluation, Capitalized costs, Cost analysis, Operating costs, Technology, Residues, Pyrolysis, *Waste recycling, *Manures, Manufactured gas, Solid wastes, Developing country application, Synthetic fuels, *Bioconversion.

Agriculture waste material such as steer manure has an energy value which ranges from 3000-8000 BTU per pound of solid material. This material is currently being used, almost exclusively, in its traditional manner as an addition to agricultural croplands. This study concludes that there is a commercially viable energy potential from agricultural waste conversion using an anaerobic digestion system.

PB-296 364/3 PC A04/MF A01
Agency for International Development, Washington, DC.
Alternative Energy Systems in Rural Mauritania
Daniel C. Dunham. Sep 77, 67p
Grant AID/afr-G-1355

Keywords: *Mauritania, *Solar energy, Hot water heating, Distillation, Pumping, Artificial lift(Wells), Cooking devices, Cookery, Crop driers, Refrigeration, Electric power generation, Rural areas, Africa, *Wind energy, *Energy source development, Energy sources, Developing country application, Solar stills, Solar dryers, Solar water heaters, Wind power.

This report contains background data and recommendations on the potential of simple demonstration projects in the use of alternate energy sources in Mauritania, West Africa. The study is limited to those energy applications which would use the materials and technical skills available in the area at this time, i.e., solar energy, wind energy, and water power.

PB-296 382/5 PC A14/MF A01
Colorado State Univ., Fort Collins.
Water Lifters and Pumps for the Developing World
Master's thesis
Alan D. Wood. 1976, 316p
Contract AID/csd-2460

Keywords: Pumps, Developing countries, Water supply, *Irrigation, History, Valves, Reviews, Technology assessment, Theses, *Water pumps, Water lifters, Developing country application, State of the art.

This thesis presents a state-of-the-art on water lifters and pumps which are, or can be, used throughout the world, and particularly in developing areas. A brief review is given of the historical development of these devices. Through an extensive literature review and survey of manufacturers and research organizations, this thesis inventories the wide range of water lifting methods which are randomly discussed by these sources and sets forth; (a) a unifying classification format, (b) the basic operation and typical applications of each class, and (c) a review of applicable prime movers. In addition, criteria used in the selection of water lifters and prime movers is presented with emphasis on water requirements, availability and cost analyses. In this manner, the present status of water lifting in both developing and developed countries is reviewed and several recent projects by international organizations, e.g., AID, are identified which seek to improve existing methods, develop new ones, and disseminate educational material. Through this state-of-the-art, similar and additional areas of water lifting which need technological or sociological attention are then explicitly or implicitly identified.

PB-296 385/8 PC A03/MF A01
Wisconsin Univ.-Madison. Coll. of Engineering.
Cryogenic Recycling of Solid Waste
Norman R. Braton. 1978, 26p

Keywords: Materials recovery, Solid waste disposal, Cryogenics, Brittle fracturing, Separation, Elastomers, Metal scrap, Polymers, Mobile equipment, Waste utilization, *Industrial wastes, *Waste recycling, Developing country application, Tire recycling, Waste processing, Metal recycling, Waste processing plants.

Liquid nitrogen cryogenic processing of various materials is introduced. Fracture toughness of materials is discussed in relation to cryogenic processing, and some specific applications of cryogenic recycling are mentioned. A short description of a mobile prototype unit for cryogenic processing of a variety of materials including tires and cables is given.

PB-296 404/7 PC A06/MF A01
Volunteers for International Technical Assistance, Inc., Schenectady, NY.
Evaluation of Solar Cookers. Part I
1962, 108p Rept no. VITA-10
Prepared in cooperation with Office of Technical Services, Washington, DC.

Keywords: Cooking devices, Solar heating, Evaluation, *Solar heating systems, Developing country application, *Solar cookers.

The report presents results of tests performed on various solar cookers to determine their potential usefulness in countries served by the International Cooperation Administration. Points evaluated were cooking performance and efficiency, durability, cost, shipping weight, portability, ease of operation, ease of manufacture in the countries involved, and adaptability to local techniques and dietary mores. Of all models available for test, a Fresnel-type cooker developed by VITA showed the greatest promise, due particularly to its efficiency, low cost and ease of construction with universally available tools and materials.

PB-296 411/2 PC A03/MF A01
California Univ., Berkeley.
Large-Scale Production of Algae
William J. Oswald, and Clarence G. Golueke. 1967, 50p
Presented at the International Conference on Single-Cell Protein Held at Cambridge, MA. on October 9-11, 1967.

Keywords: Aquaculture, *Algae, Primary biological productivity, Pilot plants, Proteins, Cost analysis, Ponds, Propeller pumps, Competition, Photosynthesis, Food, Water consumption, Utilization, Efficiency, Feeding stuffs, Drying, Processing, Land use, California, Developing country application, Mariculture, Global.

Pilot plant studies in a one-million liter plant at Richmond, California indicate that the cost of algae in projected large plants would be from three to ten cents per pound--about 10% of the cost projections made ten years ago for algae in large-scale culture. Reductions in predicted costs, have resulted from the engineering development of a simple growth system which consists simply of a shallow open pond mixed by means of large conventional propeller pumps. Based on results obtained with the Richmond pilot plant, it can be demonstrated that algal culture should be competitive with conventional agriculture for use of land, water, energy, capital, and human resources. This conclusion is based on the evidence that algae culture requires only one-tenth as much land, one-fifth as much water, three fourths as much power, one-fifteenth as much labor, and one-fourth as much capital as is required by conventional agriculture to produce an equal amount of protein. Based upon current costs of protein and attainable photosynthetic efficiencies, large-scale algal culture should soon contribute significantly to the world's protein resources at a cost below any competitive source of protein.

PB-296 424/5 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
A Guide to the Measurement of Axle Loads in Developing Countries Using a Portable Weighbridge
c1978, 24p Rept no. ROAD NOTE-40

Keywords: *Pavements, Loads(Forces), Axles, Weight measurement, Developing countries, Traffic surveys, Highway planning, Portable bridges, Platforms, Great Britain, *Roads, Foreign technology.

In many developing countries road traffic is growing rapidly both in volume and in the size and weight of the vehicles using the roads. As a consequence highway engineers concerned with designing new roads or the strengthening of existing roads in developing countries require reliable information about the distribution of the axle loads of existing traffic, and when possible, information on national or regional axle load trends. The importance of reliable information on axle loads for pavement design purposes is emphasized by the now widely accepted assumption that the degree of pavement damage caused by an axle load is proportional to approximately the fourth or fifth power of the axle load. To provide adequate information on axle load distributions road-side surveys of axle loads are required. Such surveys can conveniently be made using portable wheel-weighing devices. This note describes a simple and convenient procedure for making axle load surveys in developing countries using portable weighing platforms. The procedure is based on experience gained by staff of the Overseas Unit who have undertaken a considerable number of axle load surveys in several developing countries.

PB-296 425/2 PC A11/MF A01
ACTION/Peace Corps, Washington, DC.
Wells Manual. Special Issue
Program and training journal
Francis A. Luzzatto. Jan 75, 243p

Keywords: *Water wells, Manuals, Technology, Construction, Well pumps, Specialized training, Developing countries, Foreign aid, Potable water, Ground water, Africa, *Water pumps.

The manual is to provide information on a wide range of well construction techniques. Hopefully, the user will not see each method of construction separately, but rather be able to synthesize techniques to fit the particular situation. The manual offers a number of technical and methodological combinations, making it possible to select the most efficient well method.

PB-296 444/3 PC A03/MF A01
Bio-Gas of Colorado, Inc., Arvada.
Energy Potential Through Bio-Conversion of Agricultural Wastes
Oct 76, 32p
Contract FCRC-651366075
Prepared in cooperation with Colorado Energy Research Inst., Golden.

Keywords: *Agricultural wastes, Fuels, *Fertilizers, Feeding stuffs, Organic compounds, *Methane, Residues, *Algae, Technology, Farm crops, Food processing, Sites, Feasibility, Forecasting, Capitalized costs, Electric power plants, Process charting, Design criteria, Economic analysis, *Waste recycling, *Bioconversion, Synthetic fuels, Manure, Developing country application, Manufactured gas, Solid wastes.

To determine the feasibility of using the bio-conversion process, the Bio-Gas study team examined factors ranging from an inventory of readily collectable agricultural wastes in the area to an evaluation of the potential markets for the products of bio-conversion. The results of this study point favorably toward large-scale bio-conversion plants and to potential applications of bio-conversion on a small scale for dairies and feedlots. The study's economic analysis concludes that the methane produced from such a bio-conversion facility would be cheaper than all other domestic synthetic

natural-gas sources. The residue produced from this process could be marketed as fertilizer, and the algae produced has potential use as a high-protein cattle feed.

PB-296 496/3 PC A05/MF A01
Woods Hole Oceanographic Institution, MASS.
Factors Limiting the Development of Aquaculture: A Japanese Experience
Technical rept.
Yoshiaki Matsuda. Apr 79, 85p Rept no. WHOI-79-47
Grant NOAA-04-8-M01-149
Sponsored in part by Pew Memorial Trust, Philadelphia, PA.

Keywords: *Japan, *Aquaculture, History, Management, Supply(Economics), Demand(Economics), Rural areas, Developing countries, Social effect, Foreign technology.

An understanding of those factors which have limited the development of Japanese aquaculture may have some applications to the problems of aquaculture in developing countries. The history of aquaculture in Japan is reviewed from chronological, geographical, species and institutional points of view. Conclusions reached in this study reveal that throughout the history of Japan aquaculture development has been limited by variables which can be identified. The most important factor is the existence of leadership which coordinates supply and demand, environmental suitability, technical capability, legality, experience, infrastructure and social welfare incentives with economic feasibility. The development of aquaculture depends on simultaneous development of all these factors, not on the preponderance of any one of them. Within the framework of this generalization, issues pertaining to aquaculture development in developing countries could be handled by adaptation to local conditions.

PB-296 515/0 PC A06/MF A01
Agency for International Development, Washington, DC.
The Araque Methane Gas and Fertilizer Plant
Project rept. no. 1
Pat Doherty, Stan Huncilman, Max Kroschel, and Paul Warpeha. May 76, 118p

Keywords: *Methane, *Fertilizers, Anaerobic processes, Organic compounds, Technology, Bacteria, Decomposition, Fermentation, *Agricultural wastes, Sludge digestion, Heat treatment, Design criteria, Laboratory equipment, Pilot plants, Forecasting, *Waste recycling, *Bioconversion, Solid wastes, Araque(Ecuador), Manure, Developing country application.

The Araque Methane Gas and Fertilizer Plant Project, funded by the U.S. Agency for International Development and provided technical assistance by the Peace Corps, was conceived for the purpose of investigating the possibility of developing systems of anaerobic bacterial decomposition as a means of providing methane gas, as a fuel, and a high quality fertilizer product for the people of rural Ecuador. This project aimed at the production of methane gas for the ultimate production of bread in the community of Araque, Province of Imbabura, Ecuador. The report deals with the general technology of anaerobic bacterial decomposition and the production of the fuel and fertilizer products; history of the project describing the experimental work and the initial construction; problems encountered and the future of the project.

PB-296 541/6 PC A04/MF A01
Defense Supply Agency, Alexandria, VA.
Graphic Presentation
Oct 67, 53p Rept no. DSAH-5025.4

Keywords: Graphic methods, Visual aids, Management methods, Graphic arts, Instructional materials, Charting, Charts, Diagrams, Maps, Projectors, Flow charting, Cost engineering, *Management techniques, Developing country application.

The handbook is prepared basically as guidance for effective use and economical development of the visual aid as a management tool. It recognizes that the visual aid is the 'end product' of a responsibility jointly shared by the presenter and the illustrator. These guidelines represent an approach to the whole job of graphic presentation, both from the viewpoint of the presenter and the illustrator. The division of remarks in each of these two separate areas has been purposely avoided throughout to promote a broad understanding of the problems and solutions on both sides.

PB-296 542/4 PC A06/MF A01
Colorado Energy Research Inst., Golden.
Methane on the Move. A Discussion of Small Anaerobic Digesters
Final rept.
Susan Schellenbach, Wayne Turnacliff, Fred Varani, John L. Burford, Jr, and Shelley B. Don. Mar 77, 101p
Contract FCRC-651366075
Prepared in cooperation with Bio-Gas of Colorado, Inc., Loveland.

Keywords: *Methane, Anaerobic processes, *Agricultural wastes, Design, Colorado, New Mexico, Arizona, Utah, Nevada, Process charting, Feasibility, Performance evaluation, Cost analysis, Solid waste disposal, Fertilizers, *Bioconversion, *Waste recycling, *Manures, Synthetic fuel, Manufactured gas, Developing country application.

This report is a discussion of small anaerobic digestion units, stimulated by experiments operated by Bio-Gas of Colorado. A grant from the Four Corners Regional Commission to the Colorado Energy Research Institute enabled Bio-Gas to build a 12 to 50 cow digestion unit on a trailer which could be pulled by a tractor to 19 different demonstration sites in Colorado, New Mexico, Arizona, Utah and Nevada. During this same period, Bio-Gas conducted laboratory experiments to determine yield coefficients of different manures and defined parameters to evaluate the economic feasibility of building digesters on a small or self-sufficiency scale. First the report describes the mobile digestion unit of 6,000 gallons with its start-up phases, operation, production and problems. Secondly, a discussion of the tour and a summary of the Journal in the Appendix tell how the digester performed and how it was received among the people who came to see the demonstration. Finally, the report includes designs for four different sizes of digesters based on data collected from the mobile unit, the tour and the laboratory, along with an order blank for shop drawings. A series of design tables which let interested persons easily size a digestion system and tailor it to their specific needs are included. The tables estimate gas production from a variety of manures and system sizes so the economics of the system can be studied.

PB-296 567/1 PC A04/MF A01
PERT Coordinating Group, Washington, DC.
PERT Guide for Management Use
Jun 63, 65p

Keywords: PERT, Network analysis(Management), Management methods, Operations research, Project planning, Decision making, Performance evaluation, Objectives, Time measurement, Scheduling, Coordination, Project management, Organization theory, Control charts, *Management techniques, Program evaluation, Developing country application, Organizational communication.

PERT is a set of principles, methods, and techniques for effective planning of objective-oriented work thereby establishing a sound basis for effective scheduling, costing, controlling and replanning in the management of programs. The purpose of this document is to: establish a basic reference on management and PERT concepts as an improved communication system for all management levels; set forth PERT principles and methods for use by managers in the achievement of objective-oriented work; and to stimulate consistency in the regular application and use of PERT in the decision making process and maintain uniformity among government and industrial teams.

PB-296 569/7 PC A06/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
National Approaches to the Acquisition of Technology
Development and transfer of technology series no. 1
Marcus B. Finnegan. 1977, 120p

Keywords: Licenses, *Technology transfer, Government policies, Regulations, Technological intelligence, Commercial law, Technology assessment, Contract terms, Exports, Imports, Developing countries, Industries, Patents, Acquisition, International law, *Industrial development, Developing country application.

The study is intended to discuss many of the principles, business practices, and laws that govern licensing, and, more generally, transfer of technology in the world at large. It includes an examination of broad principles and of specific problems in specific parts of the world.

PB-296 570/5 PC A10/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
UNIDO Abstracts on Technology Transfer. Studies and Reports on the Development and Transfer of Technology (1970-1976)
Development and transfer of technology series no. 2.
1977, 205p

Keywords: Bibliographies, Abstracts, *Technology transfer, Research, Subject indexing, Index terms, Documents, Technological intelligence, Technology innovation, Inventions, Information services, *Research and development, Developing country application.

The report contains abstracts of selected documents on the subject of technology development and transfer. The report consists of two parts: a subject index, by title, and bibliographical abstracts. Only abstracts from 1970 onward using major descriptors in the computer program are included.

PB-296 571/3 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
The Manufacture of Low-Cost Vehicles in Developing Countries
Development and transfer of technology series no. 3.
1978, 40p

Keywords: Manufacturing, Vehicles, Developing countries, Ground vehicles, Cost engineering, *Transportation, Marketing, Demand(Economics), Automotive industry, *Automobiles, Automotive engineering, Government policies, Market surveys, India, Philippines, South Korea, Thailand, New Guinea, Developing country application.

The purpose of the study is to assist in promoting the manufacture and use of low-cost vehicles in developing countries. It is designed to assist government officials responsible for formulating policies on modes of transportation in their countries and businessmen concerned with the manufacture of various types of transport vehicles. It describes the main types of low-cost vehicles, what is involved in launching their manufacture, and aspects of marketing them. It reviews recent developments in several Asian countries, with particular emphasis on India and the Phillippines, where low-cost vehicles have significantly penetrated the market. Annexes provide a descriptive listing of types of low-cost vehicles with names and addresses of manufacturers.

PB-296 572/1 PC A08/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Technology for Solar Energy Utilization
Development and Transfer of Technology series no. 5.
Hans Kleinrath, V. G. Bhide, and Jean Paul Durand. 1978, 160p

Keywords: Technology transfer, *Solar energy, Electric power generation, Solar power generation, Swimming pools, Greenhouses, Kilns, Refrigeration, Space heating, Water heaters, Air conditioning, Crop driers, Utilization, Solar water pumps, Solar collectors, Flat plate collectors, Solar space heating, Solar water heaters, Solar air conditioning, Solar stills, Solar drying, Solar cooking, Developing country application.

This report discusses work being done in various countries and institutions, and contains 17 technical papers dealing with the conversion of solar energy into mechanical or electrical energy, the design of solar collectors, the utilization of solar energy in heating, cooling, distillation, drying and cooking, and the transfer of technology.

PB-296 573/9 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Audio-Visual Techniques for Industry
Development and transfer of technology series no. 6
John Halas, and Roy Martin-Harris. 1978, 92p

Keywords: Specialized training, Developing countries, Visual aids, Industries, Utilization, Manuals, Films, Display devices, Learning, *Management techniques, *Training, Developing country application.

The manual has been designed for persons in developing countries responsible for initiating or expanding the use of audio-visual facilities and techniques in industry in the hope that it will help them to improve their presentations through the use of some basic techniques. It is designed for the person in developing countries who has little or no background in audio-visuals but needs detailed information about how he can use these techniques in an economical, efficient way, taking into considerations his own local conditions. Annexes are provided which contain standard technical information that is frequently requested.

PB-296 574/7 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Technologies from Developing Countries
Development and transfer of technology series, no. 7.
1978, 46p

Keywords: Technology, Developing countries, Information systems, Data acquisition, Industries, *Technology transfer, Developing country application.

The volume provides information on 138 technologies from developing countries. Under each heading a brief description of the technology and its distinctive features are given. Heading technologies include plants and plant products; animal products; food industry; leather; wood, pulp, and paper; textiles; energy; chemicals; plastics; construction; metals; and machinery.

PB-296 575/4 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Process Technologies for Phosphate Fertilizers
Development and transfer of technology series no. 8
K. R. Krishnaswami. 1978, 57p

Keywords: Inorganic phosphates, *Fertilizers, Process charting, Sulfuric acid, Phosphoric acid, Cost analysis, *Phosphates, Ammonium phosphates, Ammonium phosphate sulfates, Ammonium nitrate phosphates, Ammonium phosphate urea, Developing country application, Phosphate/nitro.

The most important processes used for making phosphate fertilizer materials are summarized in this document. A guide is provided to the selection of process technologies for developing countries interested in initiating efforts in this sector. The processes for a given product are grouped together, and in every case the following information is given: description of the process operations; flow chart; advantages and disadvantages relative to the other processes in the same section; owner, in the case of proprietary processes; and engineering licenses, if any. More details about the processes can be found in the publications listed in the bibliography and from the firms named in the description, whose addresses are given in the annex.

PB-296 576/2 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Process Technologies for Nitrogen Fertilizers
Development and transfer of technology series no. 9
V. S. Pillai. 1978, 74p

Keywords: *Fertilizers, *Nitrogen, Process charting, Ammonia, Urea, Ammonium sulfate, Ammonium halides, Nitric acid, Ammonium nitrate, Sodium nitrates, Potassium nitrate, Cost analysis, Ammonium chloride, Ammonium nitrate sulfates, Ammonium calcium nitrates, Developing country application.

The most important processes used for making nitrogen fertilizer materials are summarized in this document. A guide is provided to the selection of process technologies for developing countries interested in initiating efforts in this sector. The processes for a given product are grouped together, and in every case the following information is given: description of the process operations; flow chart; advantages and disadvantages relative to the other processes in the same section; owner, in the case of proprietary processes; and engineering licenses, if any. More details about the processes can be found in the publications listed in the bibliography and from the firms named in the description, whose addresses are given in the annex.

PB-296 577/0 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Brickmaking Plant: Industry Profile
Development and transfer of technology series no. 10
Ian Knizek. 1978, 64p

Keywords: Brick industry, Manufacturing, *Industrial plants, Production methods, Equipment, *Bricks, Cost analysis, Fixed investment, Manpower, Requirements, Raw materials, Operating costs, Profits, Losses, Marketing, Transportation, Kilns, Energy, Utilities, Developing country application.

The document presents basic information on all the important parameters involved in setting up and running a mechanized brickmaking plant. The study discusses the available processes; main equipment involved; material used; space, energy and utilities; manpower (number and type) needed for a given capacity; the size of the investment for a specific production; and an idea of product costs.

PB-296 578/8 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
Technological Profiles on the Iron and Steel Industry
Development and transfer of technology series no. 11
G. P. Mathur. 1978, 55p

Keywords: Iron and steel industry, Technology, Profiles, Technological intelligence, Iron ore deposits, Production, Reserves, Beneficiation, Agglomeration, Iron ores, Steel making, Steel castings, Tables(Data), *Steel industry, Developing country application.

The report contains four sections: (1) World Iron Ore Survey; (2) Ironmaking; (3) Steelmaking; and (4) Steel Casting.

PB-296 581/2 PC A03/MF A01
Woods Hole Oceanographic Institution, MA.
Fisheries Policy and the Underdevelopment of Inshore Pacific Mexico
Technical rept.
James R. McGoodwin. Apr 79, 47p Rept no. WHOI-79-44
Grant NOAA-04-8-M01-149
Sponsored in part by Pew Memorial Trust, Philadelphia, PA.

Keywords: Shrimps, *Fisheries, *Mexico, Management, Exports, Industries, Developing countries, Rural areas, Coasts, Income, Growth, Archaeology, Food processing, Sinaloa(Mexico), Cooperatives.

Development of shrimp-export industry brought about the underdevelopment of Pacific Mexico's inshore fisheries. The rural fishery of south Sinaloa provides a case in point, as well as a point of departure for considering fisheries development and management policy for similar fisheries in certain other less developed countries.

PB-296 582/0 PC A06/MF A01
United Nations Educational, Scientific and Cultural Organization, Bangkok (Thailand). Library.
Appropriate Technology: A Bibliography of Books and Other Materials
Nov 78, 113p

Keywords: Bibliographies, Developing countries, Technology, Subject index terms, *Technology transfer, Methodology, Asia, Developing country application.

Listed in this bibliography are 409 titles on village or intermediate technology which have been tried and tested. An index contains 417 subjects on which information may be obtained. Addresses and sources for obtaining these documents are given at the end of the bibliography.

PB-296 635/6 PC A08/MF A01
National Technical Information Service, Springfield, VA. Developing Country Staff.
Global Listing of Appropriate Technology Organizations and Sources
Paul Bundick. 1979, 169p

Keywords: Technology assessment, Organizations, Directories, Research, Technical societies, Scientific societies, States(United States), Foreign countries, Sources, Technology innovation, Technological intelligence, Information centers, *Information sources, *Technology transfer, International organizations, National organizations, Research and development, Developing country applications, Information dissemination.

The directory is a comprehensive listing of addresses of worldwide organizations, research institutes, and development groups involved in some aspect of appropriate technology. The list was compiled in 1978 from numerous sources. It is organized alphabetically by region, country, and organization. The United States is arranged according to states. This is only a listing of addresses and is not intended to be a guide to the specific activities of each appropriate technology source.

PB-296 654/7 PC A03/MF A01
Intermediate Technology Development Group, London (England).
Metodos Simples para Fabricar Velas (Simple Methods of Candle Manufacture)
c1975, 29p Rept no. ISBN-0-903031-49-3
Text in Spanish.

Keywords: Manufacturing, *Candles, Processing, Equipment, Guidelines, Developing countries, Casting, Drawing, Dipping, Pouring, *Industrial plants, Developing country application.

Dipping, pouring, casting, drawing--all these basic candle-making processes are described in detail in this guide. For each process a list of equipment that is needed is included; whenever possible, readily available tools and techniques are substituted for more expensive commercial products. Numerous drawings and diagrams illustrate the text.

PB-296 655/4 PC A04/MF A01
Intermediate Technology Development Group, London (England).
Un Manual Sobre Mantenimiento de Edificios, Tomos 1: Administration (A Manual on Building Maintenance, Volume 1: Management)
Derek Miles. c1976, 69p Rept no. ISBN-0903031-28-0
Text in Spanish.

Keywords: *Buildings, Maintenance, Maintenance management, Personnel management, Budgeting, Inventory control, Equipment replacement, Great Britain, Developing country application.

This manual is intended to set out the guidelines for a system of budgeting and financial control of maintenance procedures in developing countries. Maintenance work is very diverse and difficult to group into clear categories for budgeting purposes. This manual will help establish efficient control procedures including a resource budget which covers finance, manpower, materials and equipment, together with a rational and practical system for measuring output and performance. In Volume 2 methods by the same author deals with the basic technology of building maintenance.

PB-296 720/6 PC A03/MF A01
Food and Agriculture Organization of the United Nations, New York.
La Erosion y Su Control (Erosion and Its Control)
Pieter Van Ginneken, and Jose Ramon Mora. Jan 79, 29p
Text in Spanish.

Keywords: *Soil erosion, Erosion control, Developing countries, Soils, Classifications, Channel stabilization,

Ditches, Vegetation, Retaining walls, Farms, Developing country application.

This introductory report describes three different types of erosion, their causes, and methods used to control erosion and preventative treatments of the soil. These are described step by step, and applicable diagrams are included, e.g. the construction of drainage channels and ditches, depending on the type and steepness of the soil; different terracing methods; types of vegetation beneficial to the prevention of erosion, especially for the prevention of slides and the building of retaining walls. The report is suited to the available resources in underdeveloped countries, and is primarily for use by farmers and small communities interested in improving the condition of the land. It is by no means a technical treatise.

PB-296 721/4 PC A03/MF A01
Centro Cooperativo Tecnico Industrial, Tegucigalpa (Honduras).
Estudio Tecnico-Economico para la Fabricaion de Cal en Honduras (Technical-Economical Study on the Production of Lime in Honduras)
1956, 43p
Text in Spanish.

Keywords: *Industrial plants, *Calcium oxides, Manufacturing, Mines(Excavations), Plant location, Fuel consumption, Marketing, Plant layout, Kilns, Cost estimates, Market surveys, *Honduras, *Chemical industry, Lime, Developing country application.

The study examines the development of lime production in Honduras, the traditional and possible future uses of lime. It also describes the location of the quarries and their geological origin. Included is a design for a limestone plant using available fuel to the best advantage, the most desirable location of such a plant in relation to the availability of limestone deposits, fuel sources, and marketing. In addition, construction layout and a model for an efficient lime kiln is provided. Analysis of different sources of limestone, operating cost effeiciency, local markets, estimated consumption, and export analyses are covered. Text in Spanish.

PB-296 722/2 PC A04/MF A01
Agency for International Development, Washington, DC.
Evaluacion Comparativa Entre Paises de Organizaciones de Pequenos Agricultores (Comparative Evaluations between Countries with Small Farmer Organizations and Their Programs, Ecuador, Honduras
Final rept.
Judith Tendler. Nov 76, 73
Text in Spanish.

Keywords: Cooperation, Agriculture, Credit, Rural areas, Farm management, Financing, Economic development, *Ecuador, *Honduras, Federal assistance programs, *Agricultural cooperatives, Cooperatives, Rural development, Financial support.

Nine different AID programs are discussed directed to small farmer organizations in Ecuador and Honduras. Two of these programs deal with the organization of credit cooperatives. Other programs are discussed which deal with commercial cooperatives and the creation of private cooperatives and a central office for the assistance of cooperatives in the public sector. Factors that contribute to the success or failure of these programs, recommendations on what course AID should follow, inter-agency coordination in rural development programs, and the economic and political aspects of the above programs are presented.

PB-296 916/0 PC A03/MF A01
Agency for International Development, Washington, DC.
Progres et Perspectives de la Production Alimentaire (Progress and Prospects for food Production)
F. W. Parker. 1956, 31p
Text in French.

Keywords: Production, Food, Developing countries, United States, Comparison, Mexico, Brazil, India, Yugoslavia, *Food supply, Developing country application.

Food Production in developing countries is compared with that in developed countries, principally the United States. Mexico, Brazil, India, and Yugoslavia provide statistics as sample developing countries. Use of fertilizers and pesticides is discussed, conditions for progress outlined, and prospects for improvement mentioned.

PB-296 917/8 PC A04/MF A01
Soil Conservation Service, Washington, DC.
Petit Manuel de Conservation des Eaux et du Sol (Teaching Soil and Water Conservation)
Albert B. Foster, and Adrian C. Fox. 1966, 58p
Text in French.

Keywords: Soil conservation, Water conservation, *Soil erosion, Visual aids, Manuals, Education, Sediments, Soil properties, Soil texture, Cultivation, Plants(Botany), Irrigation, Vegetation, Leguminous plants, Mulches, Slopes, *Water management, Developing country application.

Techniques for presenting graphic visual demonstrations that explain how soil is formed and eroded are described in detail. Methods to teach conservation practices with equal visual proof by demonstration are then given in a systematic manner that can help community leaders or agricultural extension workers teach basic conservation.

PB-296 918/6 PC A06/MF A01
Agricultural Research Service, Washington, DC.
Les Maladies de la Tomate: Prophylaxie et Traitement (Tomato Diseases and Their Control)
S. P. Doolittle, A. L. Taylor, and L. L. Danielson.
1960, 123p
Text in French.

Keywords: Tomato plants, Plant diseases, Bacteria, Mushrooms, Viruses, Nematoda, *Pest control, Recommendations, *Vegetables, Developing country applications.

Forty three separate tomato diseases are covered including maladies caused by bacteria, mushrooms, viruses, nematodes, and unknown agents. General methods for controlling all these diseases are given and a helpful section listing the various symptoms of tomato diseases is included for easy identification of what problem is affecting your crop.

PB-296 964/0 PC A02
California Univ., San Diego, La Jolla. Dept. of Anthropology.
Successful Mexican Tuna Cooperatives: A Model for U.S. Fishermen
John S. Petterson. Mar 79, 15p NOAA-79051504
Grant NOAA-04-7-158-44121
Microfiche copies only.

Keywords: Tunas, Organization, Fishing, Mexico, *United States, *Fishery cooperatives, Sea Grant program, Cooperatives.

Some of the means by which Mexican tuna cooperatives have been able to successfully adapt to physical and social conditions are identified. The difference between the successful adaptation of the Mexican cooperatives and the less than successful adaptation of many U.S. fishing cooperatives has been a product of the complex interaction of numerous historical and cultural variables. Although conditions in Mexico and the United States are not directly parallel, some of the mechanisms employed by the Mexican fisherman in adapting to changing conditions could prove useful to U.S. fishermen in solving their own problems.

PB-297 043/2 PC E13/MF E13
Solar Energy Information Services, San Mateo, CA.
Engineer's Guide to Solar Energy
Yvonne Howell, and Justin A. Bereny. cFeb 79, 330p* Rept nos. SEIS-79/1, ISBN-0-930978-04-8
Library of Congress catalog card no. 78-62956

Keywords: *Solar energy, Manuals, Solar power generation, Solar cells, Photovoltaic cells, Solar radiation, Biomass, Wind power generation, Heat storage, Swimming pools, Heat pumps, Space heating, Buildings, Heat loss, Heating load, Cooling load, Design, Performance, Thermal efficiency, Cost analysis, Bibliographies, Dictionaries, Industries, Directories, Photographs, Drawings, Systems engineering, Tables(Data), Solar space heating, Solar water heating, Ocean thermal energy conversion, Passive solar heating systems, Solar collectors, Flat plate collectors, Concentrating collectors, Solar air conditioning, Solar cooling systems, Solar heating systems, Solar power plants.

The Engineer's Guide to Solar Energy is designed to enable professionals in any field of engineering, architects, builders, and tradesmen to develop a working knowledge of solar heating technology. It is also designed to serve as a basic textbook to introduce college students to the field of solar energy. The Guide, organized into 13 basic chapters, offers vital and up-to-date information on the following subjects: (1) An overview of the six basic solar technologies; (2) a comprehensive discussion of the solar resource, including a compendium of worldwide solar radiation data; (3) an introduction to passive solar technology; (4) extensive discussion of active solar systems, including applications for heating swimming pools, domestic hot water, and space heating; (5) methodology for calculating building heat loss and gain, including worldwide design temperature data; (6) an introduction to solar systems sizing through utilization of the f-chart method, including examples and worksheets; (7) a Solar Heating Product Directory divided into four sections: collectors, controls, pumps, and storage; (8) an Annotated Bibliography highlighting significant solar heating literature, including program and planning documents published by the U.S. Government; (9) a four-part Solar Dictionary consisting of: glossary, acronyms, nomenclature and conversion factors (English to metric SI units). Copyright (c) 1979 by Solar Energy Information Services.

PB-297 072/1 PC A02/MF A01
Inter-Univ. Consortium for International Development, Columbia, MO.
Trickle-Up Development Through Aided Self-Employment
Glen Leet. 12 Mar 79, 21p
Paper presented at the Comparative Social Development State of the Art Conference, Held at Columbia, MO. on October 30, 1978.

Keywords: *Community development, *Employment, Productivity, Developing countries, Rural areas, *South Korea, *Mexico, *Greece, Return on investment, Low income groups, Developing country application, Poverty groups.

The document is designed to stimulate growth with equity by involving the poorest of the poor in productive self-help. The process described has encouraged over 97 million days of community service on activities planned by people for their collective benefit. Programs are cited in Greece, the Republic of Korea, and a continuing program in Mexico spanning 15 years in over 20,000 communities.

PB-297 074/7 PC A02/MF A01
International Society for Community Development.
Aided Self-Employment as a Means of Enabling the Poorest of the Poor to Contribute to Development
Glenn Leet. 25 Aug 78, 25p
Paper presented at International Conference of the International Society for Community Development, Held at Jerusalem, Israel on August 25, 1978.

Keywords: *Employment, Disadvantaged groups, Management training, Economic development, Motivation, *Greece, *South Korea, *Mexico, Personnel development, Capital, Projects, Government policies, Investments, *Community development, Self help programs, Developing country application, Self actualization.

The paper is based upon the recognition of the capacity of people to think, plan, and work together, and upon the realization that as they achieve some of their hopes and aspirations, they contribute to the greater self-reliance of their communities and their nations. Programs in Mexico, Korea, and Greece are cited.

PB-297 075/4 PC A08/MF A01
Bureau of Employment Security, Washington, DC.
Techniques for Determining Manpower Skill Needs and Training Requirements
May 63, 156p AID/GM-6

Keywords: Manpower, Abilities, Requirements, Specialized training, Education, Manpower utilizations, Skilled workers, Unskilled workers, Job analysis, Labor

estimates, Reporting, *Management techniques, *Training, Developing country application, Skill development, Skilled labor.

The handbook includes methods for determining current skill needs and for introducing a continuing program of manpower reporting. Part I discusses manpower planning in obtaining information designed to meet the particular economic developments of the area it describes. Part II covers area manpower surveys to assist and support economic development in producing estimates of current and future manpower requirements in selected or in all occupations and by ascertaining the education and training needs to satisfy manpower requirements. Part III focuses on occupational guides for determining worker-job relationships in a particular occupation or group of occupations. Worksheets are included for compiling data.

PB-297 076/2 PC A04/MF A01
Organization for Economic Co-Operation and Development, Paris (France).
Methods of Project Appraisal in Developing Countries
Andre Bussery. Mar 73, 68p

Keywords: Project management, Evaluation, Developing countries, Performance evaluation, Cost effectiveness, Guidelines, Methodology, Accounting, Prices, Employment, Income, Discounted cash flow, Convergence, Divergence, Political science, Economic analysis, *Management techniques, Developing country application.

The document reviews and compares the different methods used for the appraisal of projects in developing countries. The convergencies and divergencies of the various methods are shown as well as the principle practical or theoretical problems arising from their use within the developing countries.

PB-297 077/0 PC A04/MF A01
World Health Organization, Geneva (Switzerland). ATH Programme.
Appropriate Technology for Health Directory
Apr 78, 51p Rept no. ATH-78.1

Keywords: Directories, Research, Indexes(Documentation), Foreign countries, *Health care delivery, Health care technology, Developing country application, Health services research, Subject indexes.

The directory contains the names and addresses of 210 people who are involved in the field of appropriate technology health (ATH). The listings are alphabetical by country. A subject index is included.

PB-297 078/8 PC A05/MF A01
National Project in Agricultural Communications, East Lansing, MI.
Visuals in Agricultural Extension Programs
Robert J. Ames, George H. Axinn, Landis S. Bennett, and Ellis Clough. Jul 67, 92p
Sponsored in part by International Cooperation Administration, Washington, DC. Office of Food and Agriculture.

Keywords: Agricultural economics, Specialized education, Visual aids, Instructional materials, Handbooks, Training devices, Education, Farm management, *Management techniques, *Agricultural extension services, Rural extension, Developing country applications.

The handbook is for those who are engaged in the world-wide movement of improving agricultural efficiency through extension education. The value and use of visuals in teaching new ideas is emphasized. Many useful visual aids are presented for communicating new methods.

PB-297 079/6 PC A02/MF A01
National Science and Technology Development Agency, Lagos (Nigeria).
Educating Farmers Through the Mass Media
Oyeniyi Akande. 1978, 17p
Paper presented at National Seminar on Transfer of Research Results in Agriculture, Held at Ibadan, Nigeria, on November 21-24, 1978.

Keywords: Mass media, *Education, Agriculture, Mass communication, Research, Production, Yield, Technological intelligence, Agriculture engineering, *Agricultural extension services, Rural extension, Information dissemination, Developing country application, Scientific research, Farmers.

The paper explores the role of the mass media (newspapers, magazines, radio, and television) in assisting the agricultural research workers to get their findings across to the ultimate users--the farmers who have to adopt the new techniques in order to improve their yields.

PB-297 085/3 PC A04/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.
Bibliography of Intermediate Technology Materials Held at the International Development Data Center
Kay Ellen Auciello. 1976, 62p

Keywords: Bibliographies, Technological intelligence, Technology assessment, *Technology transfer, Information centers, Developing countries, Utilization, Adaptation, Subject indexing, Developing country application.

The document lists various publications concerned with the subjects of technology selection and adaptation for particular situations in developing countries. It contains reports, papers, articles, monographs, and serials that devote substantial coverage to various aspects of intermediate technology. The publications are arranged by broad subject categories and entered alphabetically by author. Publications listed are those as of January 1976 in the IDDC collection.

PB-297 086/1 PC A03/MF A01
Oregon State Univ., Corvallis. Agricultural Experiment Station.
Secondary Benefits and Irrigation Project Planning
Norman D. Kimball, and Emery N. Castle. May 63, 37p Rept no. TECHNICAL BULL-69
Prepared in cooperation with Department of Agriculture, Washington, DC.

Keywords: *Irrigation, Developing countries, Project planning, Benefit cost analysis, Marketing, Agricultural economics, Businesses, Oregon, Developing country application, Jefferson County(Oregon).

This manuscript presents the conclusions developed on an intensive research study of the experience of an irrigation project. The project known as the North Unit Deschutes Irrigation Project is located in Jefferson County, Oregon, and was developed by the Bureau of Reclamation. The purpose of this report is to state the principal theoretical issues and to present measures of secondary benefits. The study is also concerned with project planning.

PB-297 144/8 PC A04/MF A01
Mochudi Farmers Brigade, Botswana.
Mochudi Tool Bar (Makgonatsotlhe)
Feb 75, 54p

Keywords: Tools, *Agricultural machinery, Developing countries, Drawings, Loads(Forces), Wheels, Cultivation, Bars, Savings, Africa, Developing country application, *Botswana, Tool bars.

The Mochudi Farmers Brigade is a project of the Kgatleng Development Board which is a non-governmental development agency, dedicated to the development of Botswana and its peoples, particularly the rural sector. For a number of years it has been working to develop and perfect a multi-purpose farming implement suited to local conditions. In building simple tools for draught animals the wheels on which the implement is supported represent the single largest investment in materials, therefore, if the same set of wheels can be used for many functions it should be possible to limit the cost of necessary tools by making one set of wheels carry out many operations. After several years of testing, the Mochudi Toolbar has been perfected so that it is possible to perform all the necessary operations of conventional tillage systems as well as many unconventional operations. This booklet contains a complete set of scale drawings for the Toolbar and its various components.

PB-297 178/6 PC A04/MF A01
Agency for International Development, Washington, DC.
The Firewood Problem in Africa: Report on the AFR Firewood Conference and Request for Field Views
David French. Jun 78, 56p

Keywords: *Wood, *Fuels, *Africa, *Forestry, Meetings, Charcoal, Forest trees, Bibliographies, Planting, Area, Soils, Rainfall, Project planning, Developing country application, Deforestation, Firewood.

Firewood and charcoal are becoming less available and more expensive throughout Africa, presenting an immediate threat to the well-being of both rural and urban poor. This topic was the subject of the Firewood Workshop held June 12-14, 1978. This document discusses the need for collecting data on patterns of deforestation and the strategies for dealing with the problem. An annotated bibliography is included in the document for further investigation.

PB-297 179/4 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Agricultural Machinery Industry and Rural Industrialization in the Sudan
Background paper
M. Abdelkarim Bedri. 13 Oct 78, 46p
Report of Working Group No. 7, Appropriate Technology for the Production of Agricultural Machinery and Implements.

Keywords: Industries, *Agricultural machinery, *Sudan, Agriculture, Government policies, Planning, Production, Tractors, Cooperation, Machinery, Developing countries, Africa, Developing country application.

The paper deals with the present status and future development in the agricultural machinery industry in Sudan. Both technical and economic aspects relating to the issue of the agricultural machinery industry are discussed. An annex and bibliography are included.

PB-297 180/2 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technologies for Small-Scale Production of Cement and Cementitious Materials
Background paper
R. J. S. Spence. 13 Oct 78, 69p
Prepared by Intermediate Technology Development Group, London (England). Report of Working Group. No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: Construction materials, *Cement, Manufacturing, Portland cement, Technology, Comparison, India, Kilns, China, Indonesia, Structural clay products, Gypsum, Calcium oxides, Developing countries, Great Britain, *Building materials, *Industrial plants, Developing country application.

The report discusses small scale cement production, and the characteristics and problems in existing cement-production technology. The report covers small-scale Portland plants; lime-based cementing materials; other cementing materials such as hydraulic lime and natural cement and gypsum, and describes other cement-making processes.

PB-297 203/2 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Medicine for the Rural Population in India
Background paper
R. N. Goel. 6 Oct 78, 53p
Report of Working Group. No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Keywords: Medicine, India, *Drugs, Rural areas, Distribution systems, Quality control, Investments, Drug industry, Medical services, Developing countries, *Health care delivery, Developing country application.

The document presents ways of providing simple medicaments to the rural population in India. The suggestions are also applicable to rural areas of other developing countries with suitable modifications. The topics covered are indigenous system of medicine, allopathic home remedies, quality control, distribution systems, capital investments and financial projection, socio-economic benefits, and the present position of the drug industry in India.

PB-297 205/7 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Preservation of Vegetables in the Republic of Korea: The Processing of Kimchi
Background paper
D. H. Shin. 13 Oct 78, 25p
Report of Working Group No. 6, Appropriate Technology for Food Storage and Processing.

Keywords: Food processing, *Vegetables, *South Korea, Preservation, *Food storage, Storage life, Microorganisms, Fermentation, Developing countries, Developing country application.

Kimchi, spiced and lactic acid fermented vegetables, has traditionally been one of the most important side dishes for the daily meals of the Korean people. It is prepared by salting Chinese cabbages and/or radishes, washing the salted vegetables with fresh water, adding spices and seasoning to them, and then leaving the spiced vegetables to undergo a process of natural lactic acid fermentation. The document discusses microorganisms in kimchi fermentation; changes in properties of kimchi under fermentation; and how to extend storage life of kimchi.

PB-297 212/3 PC A06/MF A01
Institute for Local Self-Reliance, Washington, DC.
Weatherization Materials Handbook
Jan 79, 119p* CSA/I N-2399
Grant CSA-30208-G-77-01

Keywords: Handbooks, *Buildings, Thermal insulation, Storm windows, Caulking, Weatherstripping, Manufacturers, Directories, Weatherization, *Energy conservation, Storm doors, Listings.

This handbook provides information on purchasing weatherization products, and is intended for use by Community Action Agencies and other community-based organizations in their energy conservation programs. Product information is given for insulation, storm windows and doors, caulking and weather stripping, as well as a directory of manufacturers and sales information.

PB-297 226/3 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Creation of Small-Scale Industry Development in Southern Sweden - The Gnosjo Case
Background paper
Magnus Hult, and Göran Odeen. 25 Sep 78, 29p
Prepared by Swedish International Development Authority, Stockholm. Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.

Keywords: Industries, Statistical data, Economic development, Manufacturing, Employment, Economic factors, *Sweden, *Small businesses, *Industrial development, Developing country application.

The Smaland commune Gnosjo is a region which has had an extremely positive economic development during the 20th century. Gnosjo's economy is highly dependent upon a large number of small-scale industries primarily in the light manufacturing sector. Unemployment is very low. This paper analyzes Gnosjo as a practical case for an analysis model to provide an understanding of the reasons behind the positive economic development of a region.

PB-297 227/1 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. The Pharmaceutical Industry of the Republic of Korea
Background paper
S. S. Jun. 13 Oct 78, 93p
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Keywords: Drug industry, *South Korea, Development, Manufacturing, Economic development, History, Technology, Foreign aid, Public health, Insurance, Developing countries, *Drugs, Developing country application.

The study has been organized into seven chapters to cover the topics essential for examining the Korean historical experience in an effort to determine what factors aided and/or hindered the pharmaceutical industrial development. The main topics cover the pre-war era; the post war era; the era of economic development plan; the present; and public health and medical insurance. Tables of statistics are provided to understand the past and the present status.

PB-297 239/6 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Technology Planning Factors in the Cane Sugar Industry
Background paper
M. H. Tantawi. 27 Oct 78, 33p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar.

Keywords: Food industry, Sugar crops, *Industrial plants, Production capacity, Machinery, Molasses, Bagasse, Processing, Production methods, Requirements, Developing countries, Developing country application, *Sugar.

The document briefly discusses factory size and location, operations and processing requirements machinery and capacity of production.

PB-297 240/4 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in the Construction and Building Materials Industry
Background paper
G. Sebestyen. 5 Oct 78, 28p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: Construction industry, Construction materials, Technology, Manufacturing, Technology assessment, Developing countries, Agreements, Cooperation, Policies, Meetings, *Building materials, Developing country application.

In recent years the construction and building materials industry in less developed countries has become more and more important. Hence it should be awarded second priority after the food and agro industries. In construction there are several subsectors: international modern, domestic modern and traditional and small scale. Appropriate technologies are different for these subsectors. For the modern subsector technologies used in developed countries can be appropriate, however, in many cases production on a smaller scale and a lower degree of mechanization is justified. In the building materials industry too production often is to be organized on a smaller scale (cement, lime, gypsum, etc.). It is important to develop the manufacture and use of local materials (stone etc.) and of industrial and agricultural wastes. Industrialization on various levels leads to an increased effectiveness of the construction and building materials industry, this being a prerequisite to increased outputs in new housing, new industrial complexes and the construction of better national and urban infrastructures (transport systems, etc.). Governments should devote particular attention to the development of the construction and building materials industry, including the choice of appropriate technology, in order to promote economic development and the welfare of the population.

PB-297 241/2 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Choice of Appropriate Construction Technology in the Building Industry in Iran
Background paper
F. Neghabat. 5 Oct 78, 24
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: Construction industry, *Iran, Technology, Urban areas, Houses, Rural areas, Construction materials, Economic factors, Policies, Developing countries, Prefabrication, Statistical data, *Building materials, Developing country application.

An attempt has been made to present the status of construction industry in Iran. Statistics are given reflecting urban housing types, numbers existing and planned, the status of building materials and the extent of industrialization of building industry is presented. Comparisons have been made between the two categories of indigenous and imported Western technologies. Factors most important in evaluating alternative construction techniques are discussed. It is shown that the choice of appropriate technology whether indigenous or imported depends on the specifics of the project and its suitability to local conditions. The economical, labor, technical, and managerial factors, as well as the adaptability of the region to new technology is stressed. The appropriateness of indigenous technology to rural housing, and the applicability to specific project of total, partial or on-site prefabrication is described. Finally, the establishment of component industries as a foundation for a stable, equilibrium condition in building industry is emphasized.

PB-297 242/0 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Building Materials and Components
Background paper
J. P. M. Parry. 5 Oct 78, 53p
Prepared by Intermediate Technology Development Group, London (England). Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: Construction materials, Cements, Developing countries, Reinforcement(Structures), Roofs, Bricks, Tiles, Construction industry, Brick industry, Meetings, Africa, Great Britain, *Building materials, Developing country application, Villages.

The paper considers important aspects of the economics and technology of the construction sector in less developed countries especially in Africa. It then applies the lessons drawn from the analysis to suggest future policies. The design and erection of buildings to fit their purpose and the industrial manufacture of building materials are different types of activity but strongly influence each other. The earlier parts of the discussion concentrate on aspects of design from which stem particular requirements for building materials and components. Some traditional low cost ways of extending the life expectancy of normally non durable structures are briefly reviewed in the context of an examination of the normal agents of decay in buildings. Information is provided of one new manufacturing system, a technique for making low cost fibre reinforced cement roof sheets by hand which is suitable for village-scale industries. A fairly detailed examination is made of the one building product which is manufactured extensively in small scale plants--burnt clay bricks. Aspects of the brickmaking technologies and operating set-ups are examined to try to determine what features have made them so resilient. Discussion of rural brickmaking is concluded in an assessment on how it could be improved technically so as to serve its market with better quality products in manufacturing plants which use resources more efficiently, are less vulnerable to seasonal changes and provide a better operating environment for the workforce. The argument is then broadened using information on the strengths and weaknesses of the rural brick and tile industries to give guidance on how other forms of building material manufacture could be encouraged.

Finally the question is explored of how rural employment and prosperity through expanded building materials manufacture, could be aided by institutional assistance through public sources. The paper concludes with a description of actions and programs which in the light of the technical and commercial findings, might be considered for implementation on an international scale.

PB-297 258/6 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Construction and Building Materials Industry in the United Republic of Cameroon
Background paper
E. K. Mundi. 5 Oct 78, 26p
Report of Working Group. No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: Construction industry, *Cameroon, Construction materials, Cements, Gravel, Bamboo, Bricks, Wood, Buildings, Developing countries, Africa, *Building materials, Developing country application.

The United Republic of Cameroon is located between West and Central Africa. The country enjoys a tropical to subtropical climate. The country has four major regions distinguished on basis of climate and geology....factors that influence the type and distribution of building materials. The main local building materials are: cement, sand, gravel, stone, cement blocks, clay blocks, burnt bricks, hardwood, raffia bamboo, palm leaves, grass, corrugated aluminum sheets and iron rods. The main building types are constructed by a combination of these materials. Local building types are constructed by a combination of these materials. Local building materials is at a nascent stage as for example: research on concrete with palm nut shells as aggregate and research on lateritic concrete. Both research results are summarized in the paper. In view of the potential and low cost of local building materials serious research is called for at a national and regional level with an aim of understanding these materials and developing norms for their utility.

PB-297 364/2 MF A01
Intermediate Technology Development Group, London (England).
Co-Operative Organisation; an Introduction
B. A. Youngjohns. c1977, 37p Rept no. ISBN-0-903031-43-4
Microfiche copies only.

Keywords: Production, Farms, Industries, Government policies, Control, Organizations, Businesses, Great Britain, Developing country application, *Cooperatives, Cooperative farming.

The booklet is about co-operatives, how they are formed, how they work, what the legal implications are, and what role they play in development. It sets out principles of a cooperative and explains in some detail the various forms it can take, from cooperative farms to industrial production. It also deals with the government's role and the various controls which it places on such organizations.

PB-297 365/9 MF A01
Norwegian Aid Agency, Oslo.
Accounting and Book Keeping for the Small Building Contractor
Derek Miles. c1978, 196p
Sponsored in part by Intermediate Technology Development Group, London (England).
Microfiche copies only.

Keywords: Accounting, Construction industry, Contractors, Developing countries, Records management, Assets, Liabilities, Fixed investment, Capitalized costs, Depreciation, Profits, Losses, Construction costs, Financial management, *Management techniques, *Small businesses, Developing country application.

The book is the first in a series of publications written to help small contractors in developing countries establish and run a business effectively. Topics covered in the volume include: keeping records; assets and liabilities; basic book-keeping; analysis; fixed assets; depreciation; balance sheets; profit and loss accounts; reading and comparison of accounts; and practical exercises.

PB-297 366/7 MF A01
Intermediate Technology Development Group, London (England).
Simple Methods of Candle Manufacturing
David Schreiber, and Dennis Rose. c1975, 23p Rept no. ISBN-0-903031-49-3
Microfiche copies only.

Keywords: Manufacturing, *Candles, Pouring, Moulding techniques, Waxes, Melting, Great Britain, Materials, Equipment, *Industrial plants, Developing country application.

The booklet shows how, without expensive and sophisticated machinery, it is possible to manufacture candles. A description of how a candle works is given and the importance of the size of the wick is stressed. Information is provided on materials required, candle making techniques, and of the process. Line illustrations of the simple equipment that may be used are included.

PB-297 367/5 MF A01
Intermediate Technology Development Group, London (England).
Business Arithmetic for Co-Operatives and Other Small Business; a Basic Manual for the Employees of Primary Co-Operative Societies
Trevor Bottomley. c1977, 89p Rept no. ISBN-0-903031-47-7
Microfiche copies only.

Keywords: Arithmetic, Manuals, Great Britain, *Education, Developing country application, *Cooperatives, Cooperative farming, *Small businesses.

The manual is designed to enable those involved in co-operatives or small businesses to train themselves to do the calculations necessary for the running of a business. Part I of the manual is very elementary and intended only for those who feel they need to go back to the beginning. Part II covers all the calculations normally called for in a business.

PB-297 368/3 MF A01
Intermediate Technology Development Group, London (England).
Chinese Chain and Washer Pumps
Simon Watt, and John Collett. cJul 77, 67p Rept no. ISBN-0-903031-26-4
Microfiche copies only.

Keywords: Pumps, *China, Well pumps, Water supply, Chains, Drawings, Pipes(Tubes), Great Britain, *Water pumps, Developing country application.

The publication contains twenty-one versions of the chain and washer water lifting device, displayed at the 1958 Peking Agricultural Exhibition, China. Each version of the pump was designed and built by separate communes, using local materials, skills and tools. A description of each pump with performance figures is provided on simple information sheets. Drawings are included to give a basic understanding of the mechanics needed to build one of the devices.

PB-297 369/1 MF A01
Cranfield Inst. of Tech. (England). Marketing Development Centre.
Small Enterprises in Developing Countries: Case Studies and Conclusions
Malcolm Harper, and Tan Thiam Soon. c1979, 111
Sponsored in part by Intermediate Technology Development Group, London (England).
Microfiche copies only.

Keywords: Manufacturing, Soaps, Leather, Plastics, Fertilizers, Roofs, Tiles, Woolen spun yarns, Production management, Failure, Operations, Developing countries, Great Britain, *Industrial development, Developing country application, *Small businesses, Case studies.

The publication includes over 20 case studies of problems encountered by small businesses in various developing countries. There are individual commentaries on the studies and, in the second part of the book, a general discussion of the factors which determine the success or failure of a small business. A few of the case studies include soap manufacturing, a candy factory, leatherworks, plastics, fertilizer, roof tile manufacturing, a wool spinning center, and a block maker.

PB-297 370/9 MF A01
Intermediate Technology Development Group, London (England).
The Work of a Co-Operative Committee
Peter Yeo. c1978, 83p Rept no. ISBN-0-903031-53-1
Microfiche copies only.

Keywords: Organizations, Management, Planning, Great Britain, Developing country application, *Cooperatives, Loans, Cooperative farming.

The book has been written as a guide for members and prospective committee members of primary cooperatives. It deals with the basic facts about the committee, how the committee serves the members and what loans can be made to the members of the cooperative. It sets out clearly what a committee member's duties are, as well as his responsibilities in law. The book has been designed as a programmed learning text with material for six meetings of study groups, including the private study needed before each meeting. The book should prove a useful introduction for anyone who is interested in becoming a member of the committee of a cooperative.

PB-297 371/7 MF A01
Intermediate Technology Development Group, London (England).
Methane Generation by Anaerobic Fermentation; an Annotated Bibliography
Christina Freeman, and Leo Pyle. c1977, 71p Rept no. ISBN-0-903031-41-8
Microfiche copies only.

Keywords: *Methane, Anaerobic processes, Bibliographies, Reaction kinetics, Microbiology, Nutrients, Fertilizers, Construction materials, Fermentation, Fuels, Bacteria, Mathematical models, *Bioconversion, *Waste recycling, Manufactured gas, Synthetic fuels, Solid wastes, Developing country application.

This bibliography is for those who are directly involved or interested in building, designing, and improving methane generators in the developing countries. It includes the basic and relevant material required to enable those working in this field to decide on the viability of gas production and to help them learn from other people's experience.

PB-297 372/5 MF A01
Intermediate Technology Development Group, London (England).
A Manual of Building Construction
Harold K. Dancy. c1977, 379p Rept no. ISBN-0-903031-08-06
Microfiche copies only.

Keywords: Construction, Manuals, Masonry, Walls, Bricks, Layout, Excavation, Foundations, Windows, Roofs, Carpentry, Concretes, Plumbing, Utilities, Painting, Great Britain, *Building materials, *Houses, Developing country application.

The book is a practical field building manual. It is divided into five sections: preparation, masonry, carpentry, concrete, and finishing trades. Many illustrations are included for demonstrating principals in construction.

PB-297 373/3 MF A01
Intermediate Technology Development Group, London (England).
Hand Dug Wells and Their Construction
S. B. Watt, and W. E. Wood. c1977, 226p Rept no. ISBN-0-903031-27-2
Microfiche copies only.

Keywords: *Water wells, Developing countries, Construction, *Ground water, Water supply, Labor estimates, Materials, Equipment, Mixing, Concretes, Shaft sinking, Excavation, Disinfection, Safety, Linings, Great Britain, Developing country application, Villages, Self help.

The book presents a range of technology suitable for exploiting ground-water sources at low cost, with minimum sophisticated technology and with the greatest input of village labour and skills. The methods de-

scribed combine traditional principles with modern techniques. Part I describes some general principles together with a reference to the health implications of a hygienic source of water and some notes on the organization and preparation of well sinking work. Part II describes in simple detail the actual construction of a particular size and type of well that has proved successful in many parts of the world under widely differing conditions. Part III deals with alternative materials and techniques which may be more suitable in certain circumstances. Part IV describes in greater detail the standard equipment and materials used. Part V comprises additional information that may be of some use to those interested in well sinking.

PB-297 374/1 MF **A01**
Intermediate Technology Development Group, London (England).
Economically Appropriate Technologies for Developing Countries; an Annotated Bibliography
Marilyn Carr. c1976, 104p Rept no. ISBN-0-903031-19-1
Microfiche copies only.

Keywords: Bibliographies, Developing countries, *Agriculture, Construction materials, Houses, Manufacturing, Public utilities, *Roads, Economic factors, Great Britain, *Building materials, Developing country application, Appropriate technology.

The bibliography provides information on the economic aspects of intermediate technologies for developing countries. This volume is basically concerned with hardware. The material has been divided into six sections. The first four sections cover technologies related to the basic human needs of food, shelter, manufactured goods such as clothing, footware and various household items, and infrastructural goods such as power sources, water supplies, health services, roads and transportation. The last two sections contain a selection of technical publications and bibliographies which provide useful back-up material to the main studies.

PB-297 375/8 MF **A01**
Intermediate Technology Development Group, London (England).
Ferrocement Water Tanks and Their Construction
S. B. Watt. c1978, 121p Rept no. ISBN-0-903031-51-5
Microfiche copies only.

Keywords: Water tanks, Construction, Cements, Reinforcing materials, Wire, Foundations, Design, Construction materials, Water storage, Great Britain, *Irrigation, Developing country application, *Ferrocement.

This publication describes in detail, methods of constructing water storage tanks from wire-reinforced cement-mortar. These tanks are widely used in many parts of the world to collect and store water for domestic, stock, irrigation, and also for industrial purposes. Subject areas include planning and designing the tank, standard methods of construction, and alternative designs. (Copyright (c) Intermediate Technology Publications Ltd, 1978.)

PB-297 376/6 MF **A01**
Norwegian Aid Agency, Oslo.
Financial Planning for the Small Building Contractor
Derek Miles. c1979, 192p
Sponsored in part by Intermediate Technology Development Group, London (England).
Microfiche copies only.

Keywords: Financial management, Construction industry, Contractors, Planning, Scheduling, Cash flow, Investments, Billing, Accounting, Cost engineering, Resource allocation, Capital, Financing, Project management, Labor estimates, Materials estimates, Budgeting, Developing countries, *Management planning, *Small businesses, Developing country application.

This book is the second in a series of publications designed to provide ideas and techniques for good business management. Topics covered in this volume include: planning the year's work; job programs; cash flow; investment decisions; billing procedures and work study techniques. Saving time and money are also themes.

PB-297 377/4 MF **A01**
Intermediate Technology Development Group, London (England).
Small Scale Cement Plants
Jon Sigurdson. c1977, 31p Rept no. ISBN-0-903031-46-9
Microfiche copies only.

Keywords: *Industrial plants, Manufacturing, *Cement, India, China, Comparison, Portland cements, Great Britain, Bibliographies, Design, Kilns, Developing countries, Developing country application, Small businesses.

The booklet examines the criteria which would justify the establishment of mini cement plants in developing countries and specifically compares the situation in India with that in China, where more than 57% of cement is produced by small plants. The quality of the cement produced is also discussed and comparisons are drawn between cement from mini cement plants and that of portland cement. A short bibliography is provided as well as designs of vertical shaft kilns taken from a Chinese book on small scale cement plants.

PB-297 378/2 MF **A01**
Intermediate Technology Development Group, London (England).
Technology for a Changing World
Roger England, and John Davis. c1978, 66p Rept no. ISBN-0-903031-56-6
Microfiche copies only.

Keywords: *Technology assessment, Economic development, Environments, Social change, Productivity, Manpower, Capital, Energy, Businesses, Education, Technological intelligence, Quality of life, *Industrial development, Small business, Developing country application.

The booklet is concerned with the application of the concepts of appropriate technology to the economy. It is a recognition of the fact that rich and poor countries alike stand in need of a new kind of technology which is more in harmony with people and with the environment. Subject areas include the appropriateness of conventional technology; productivity; energy; small enterprises; local enterprise trusts; education for a new world; and the right to choose technologies.

PB-297 379/0 MF **A01**
Intermediate Technology Development Group, London (England).
Equipment for Rural Workshops
John E. L. Boyd, S. A. Bonnist, J. R. Collett, A. Mallett, and H. S. Pearson. c1978, 96p Rept no. ISBN-0-903031-45-0
Microfiche copies only.

Keywords: Equipment, *Woodworking, Metal working, Tools, Workplace layout, Cost estimates, Power equipment, *Machine tools, Great Britain, Developing country application.

The book is a guide to anyone who wishes to equip a workshop from the basic tools required for a one or two man carpentry workshop without power to the more sophisticated establishment requiring power equipment for both wood and metal working. Only well-known and reliable equipment is listed. The tools specified are all illustrated and workshop layouts are suggested. There are photographs of various sizes of workshops in different countries, as well as some pictures of farming equipment that has been manufactured at some of the workshops. Suppliers' addresses are also given in an appendix. Prices quoted in the books may soon be out of date, but they give an inexperienced person some idea of the budget required for a particular size of workshop.

PB-297 380/8 MF **A01**
Intermediate Technology Development Group, London (England).
A Manual on the Hydraulic Ram for Pumping Water
S. B. Watt. c1975, 53p Rept no. ISBN-0-903031-15-9
Prepared in cooperation with National Coll. of Agricultural Engineering, Silsoe (England).
Microfiche copies only.

Keywords: Hydraulic equipment, Rams(Pumps), Construction, Construction materials, Fluid flow, Design, Valves, Assembling, Pipe fittings, *Water supply, Developing country application, *Hydraulic rams.

This manual describes the process for building and installing the hydraulic ram. Part 1 explains how a simple ram pump can be made from commercial pipe fittings, how to choose a site for the ram, how to install and adjust the ram, and the sort of maintenance that the ram pump will need during its working life. Part II describes in greater detail the range and limits of the operation of ram pumps, and the different materials that have been used to make them. The manual is in non-technical language so that it can be used by people with little or no technical training.

PB-297 484/0 PC **A03**/MF **A01**
Southeast Asian Fisheries Development Center, Iloilo (Philippines). Aquaculture Dept.
Design, Operation and Economics of a Small-Scale Hatchery for the Larval Rearing of Sugpo, 'Penaeus monodon' Fab
Rolando R. Platon. Jul 78, 35p Rept no. AQUACULTURE EXTENSION MANUAL-1

Keywords: *Fisheries, Aquaculture, Southeast Asia, Developing countries, Production, Sites, Aquatic biology, Feeding stuffs, Disinfection, Reproduction(Biology), Tanks(Containers), Fishing, Harvesting, Cost analysis, Transportation, Developing country application, Penaeus monodon.

The economic importance of Penaeus monodon Fabricius (sugpo, prawn) cannot be overemphasized. This is evidenced by the interest shown by aquaculturists in Southeast Asia in the mass culture of this species. One of the major problems in the mass production of sugpo is how to obtain a constant supply of fry. Since ultimately it is the private sector which should produce the sugpo fry to fill the needs of the industry, the Barangay Hatchery Project has scaled down the hatchery technology from large tanks to a level which can be adopted by the private sector, especially in the villages, with a minimum of financial and technical inputs.

PB-297 550/6 PC **A03**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Aquaculture Development in Rural Atomistic Societies
James R. McGoodwin. Jun 79, 34p WHOI-79-53, NOAA-79061301
Grant NOAA-04-8-M01-149

Keywords: Rural areas, *Aquaculture, Developing countries, Food, Social effect, Ponds, Shortages, Japan, Mexico, Sea Grant program.

For technological innovations to succeed in alleviating problems of rural underdevelopment they must be appropriate to the sociocultural context in which they are to be developed. Technical and economic feasibility alone is not enough. Atomistic rural societies--which are societies lacking in supra-household organizational entities--are the most common societal type found in the impoverished rural regions of the less developed countries. Development efforts in such societies and especially those where shortage of food is an acute problem, should aim first at intensification and regularization of domestic food production by increasing the productivity of households. When considering aquaculture development, family-operated, housite, subsistence-oriented ponds, which employ rudimentary technology, would seem an appropriate innovation in atomistic communities. The author's field experience in an atomistic community in rural Mexico provides perspectives for the discussion.

PB-297 556/9 MF **A01**
Intermediate Technology Development Group, London (England).
Water Treatment and Sanitation; a Handbook of Simple Methods for Rural Areas in Developing Countries
H. T. Mann, and D. Williamson. Jan 76, 94p Rept no. ISBN-0-903031-23-X
Revision of report dated Jun 73.
Microfiche copies only.

Keywords: *Water treatment, *Sewage treatment, Solid waste disposal, Manuals, Transport properties, Substitutes, Rural areas, Water supply, Sludge disposal, Water resources, Water analysis, Potable water, Equipment, Design, *Waste disposal, Developing country application.

The purpose of this handbook is to provide information which must be considered when investigating the development of a water supply and sewage disposal system for a small community which is situated too far from a piped system of water supply. Many of the methods of water and sewage treatment described in this handbook are based on the standard practices used in developing countries but which can be adapted. Chapters 1-6 describe methods which may be applied in sequence, from the selection of a water source, the transport of water, the treatment of water, the disposal of wastes, sewage treatment and the final disposal of treated wastes, and the by-products of treatment processes. In each chapter, a number of alternatives is described, some suitable for self-help situations and others which may be more suitable for larger communities. A glossary is included to explain technical terms used in the text.

PB-297 559/7 MF A01
Intermediate Technology Development Group, London (England).
Food from Windmills
Peter L. Fraenkel. Nov 75, 83p
Report on the Wind Mill Irrigation Project Initiated by the American Presbyterian Mission at Omo Station in Ethiopia.
Microfiche copies only.

Keywords: Windmills, Farm crops, *Ethiopia, *Irrigation, Omo River, Cultivation, Statistical analysis, Objectives, Design, History, Pumping, Water supply, Field tests, Construction, *Wind energy, Developing country application.

This report describes work done to improve and evaluate a series of wind-mills developed for irrigating small plots of land on the banks of the Omo River, Ethiopia, using river water. The systems were developed by the American Mission for use by the local farmer to permit all year round cultivation where possible. Statistical information is included in five appendices.

PB-297 632/2 PC A03/MF A01
Agency for International Development, Washington, DC.
Introduccion al D.C. Para Los Trabajadores de las Aldeas (An Introduction to Community Development for the Village Workers)
Community Development series A, no. 1
Donald L. Beran. Apr 62, 38p
Text in Spanish.

Keywords: *Community development, Developing countries, Quality of life, Planning, Meetings, Recommendations, Guidelines, *Socioeconomic status, Developing country application, Villages.

The term community development is used to describe the approach many governments have employed to teach their village people and to make more effective use of local initiative and energy for increased production and better living standards. This booklet specifically was planned to give insights into aims, basic principles and elementary procedures in community development on which workshop procedures would be based. It offers a common-sense approach to local village development procedures.

PB-297 633/0 PC A12/MF A01
Agency for International Development, Washington, DC. Office of the War on Hunger.
Nutricion Infantil en Paises en Desarrollo (Child Nutrition in Developing Countries)
Derrick B. Jelliffe. 1971, 267p
Text in Spanish.

Keywords: Developing countries, Nutrition, *Children, Nutritional deficiency diseases, Diets, Foreign countries, Therapy, Preventive medicine, Humans, Food, Education, Indexes(Documentation), *Food services.

In recent years international recognition has accumulated to emphasize the magnitude of the problem of childhood nutrition. This handbook will help nontechnical workers recognize the significance of the problem of malnutrition in young children and help guide their efforts toward locally appropriate preventative and curative measures.

PB-297 662/9 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Institutional Development of Appropriate Industrial Technology in Developing Countries: R and D Policies and Programmes
Background paper
W. A. Fischer. 13 Oct 78, 41p
Report of Working Group on Conceptual and Policy Framework for Appropriate Industrial Technology.

Keywords: Technology innovation, Technology assessment, Developing countries, Research, Industries, Technological intelligence, *Technology transfer, Research management, Government policies, *Industrial development, Industrial technology, Institutional role, Research and development, Developing country application.

The focus of the paper is to discuss appropriate roles for industrial research and development in the developing world, within the broader context of an institutional infrastructure, as a means of facilitating the processes of technology acquisition and innovation. References are included.

PB-297 663/7 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Rural Transportation Facilities in Developing Countries
Discussion paper.
16 Oct 78, 16p
Report of Working Group No. 12, Appropriate Technology for Rural Transport.
See also PB-298 837/6.

Keywords: Developing countries, Rural areas, Facilities, Cargo transportation, Passenger transportation, Design, *Transportation, Rural transportation, Developing country application.

The document addresses the need for the design and manufacture of alternative and appropriate modes of transport, both non-motorized and motorized, specifically to meet rural requirements. The technological alternatives considered are human portage; handcarts, wheel barrows etc.; muscle-powered and pedal-driven vehicles; animal-powered transport; motorized rural transport; and boats and outboard engines. A program of action is offered for the development of alternatives.

PB-297 664/5 PC A03/MF A01
International Bank for Reconstruction and Development, Washington, DC.
Designing Rural Development Programs: Lessons from Past Experience in Africa
Uma Lele. 1974, 41
Prepared in cooperation with Reading Univ., (England), and Overseas Development Inst., Reading (England). Presented at the Second International Seminar on Change in Agriculture.

Keywords: Economic development, Projects, Rural areas, Saharan Africa, Kenya, Tanzania, *Africa, Low income groups, *Regional planning, Personnel development, Manpower utilization, Land use, Technology assessment, Resource allocation, Credit, Prices, Marketing, Rural development, Governmental role, Developing country application, Rural population.

The study examines ways of designing rural development projects which will effectively reach large numbers of low-income rural people with the limited financial resources, and in particular, the scarce trained manpower available for rural development in Africa. The study involved two components. The first consisted of a review of past projects in sub-Saharan Africa. The second involved rural sector surveys in Kenya and Tanzania. The major findings are based on thirteen sets of rural development projects and programs selected from various parts of sub-Saharan Africa to represent diversity in design and implementation as well as in the environment in which they are situated.

PB-297 665/2 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Choice and Adaptation of Appropriate Technology in Production of Drugs and Pharmaceuticals in Developing Countries
Background paper
B. Shah. 13 Oct 78, 93p
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Keywords: *Drugs, Manufacturing, Technology, Equipment, Design criteria, Cost analysis, Tables(Data), Developing country application.

This document examines the needs of developing countries in producing drugs of adequate quality in sufficient quantities and at prices within the reach of the common people. The developing countries are divided into five groups for purposes of determining their method of manufacturing based on their stage of development. Appendices are provided giving further data on drug and pharmaceutical production.

PB-297 667/8 PC A02/MF A01
Chamber of Commerce of the Philippines, Manila.
The Small Biogas Plant: Its Construction, Operation and Use
Felix D. Maramba, Sr, Enrico D. Obias, and Calixto C. Taganas. May 77, 23p

Keywords: *Methane, Farms, *Agricultural wastes, Design, Equipment, Agricultural engineering, Cost analysis, *Fertilizers, Sludge disposal, Organic compounds, Digesters, Manufactured gas, Slurries, *Bioconversion, *Waste recycling, Biogas process, Manure, Synthetic fuels, Solid wastes, Developing country application.

This booklet has been prepared in response to the demand for reference material to help interested parties design and operate small biogas plants. It is written in relatively simple language, understandable to people with limited scientific and technical training and it gives the practical approach. Because of the pressing demand for food, more fertilizer is needed to raise more crops, but supply is getting less. With a biogas plant, a one-hectar farm with one work carabao and a two-sow units or three-porker units can produce enough fuel to cook the meals of a family of sevon, light his home, iron his clothes, and produce enough fertilizer to continuously crop the farm all year round. The biogas plant is the most practical and least expensive solution to the problem relating to pollution and lack of fuel and food, particularly for rural areas. For the farmer it will be a key towards self-reliance and self-sufficiency.

PB-297 669/4 PC A04/MF A01
Agency for International Development, Washington, DC.
Research and Information Required to Support the Effort to Reach the Rural Poor
James W. Green. Jan 75, 60p

Keywords: Rural areas, Disadvantaged groups, Developing countries, Quality of life, Surveys, Project planning, Low income groups, *Socioeconomic status, *Information services, Developing country application.

The emphasis in this study is to define the poor in operational terms and to construct quality of life indicators which can be used to match the direction and extent of change brought about by any programs especially oriented to greater equity for the rural poor. The study is divided into three areas of discussion: AID policies and procedures, methods of research; and subjects of research.

PB-297 680/1 PC A08/MF A01
Intermediate Technology Development Group, London (England).
Lime and Alternative Cements: Proceedings of a One-Day Meeting on Small-Scale Manufacture of Cementitious Materials
Robin Spence. 1974, 174p Rept no. ISBN-0-903031-13-2
Sponsored in part by Transport and Road Research Lab., Crowthorne (England), and the Wates Foundation, London (England).

Keywords: Construction materials, *Cement, Pozzolans, Lime cements, Masonry cements, Mineralogy, Kilns, Manufacturing, Production, Raw materials, Developing countries, *Building materials, Developing country application, Porcellanite.

The report contains papers describing alternative cements used for construction materials. The alternative materials are proposed to maximize the use of local skills and resources and to minimize the importation of skills or goods. The papers discuss the cements, the manufacturing processes involved in their production, and the applications for using the end products.

PB-297 784/1 MF A01
Intermediate Technology Development Group, London (England).
Farm Equipment Development Project, Daudawa, N.C.S., Nigeria
Rept. for Nov 71-Dec 73
J. E. L. Boyd, and E. A. Ayok. c1974, 118p Rept no. ISBN-0-903031-48-5
Microfiche copies only.

Keywords: *Agricultural machinery, *Weed control, *Nigeria, Herbicides, Farm crops, Harvesting, Equipment, Drawings, Manufacturing, Design, Specialized training, Guidelines, Great Britain, Developing countries, Developing country application.

A survey identified weeding as a labor bottleneck limiting crop production on farms employing animal drought for land preparation. Improvement in the methods of weed control was made the primary objective of the project. The ox-drawn EMCOT ridger plough had been in use for some time in the area, and the report covers the design, development, production and use of several other machines and of attachments for the EMCOT. All items were designed for local construction from easily available materials, using simple equipment. Manufacturing instructions are included for interpretation by the non-engineer. The report is accompanied by a chart summarizing the rainfall, cropping calendar and labor inputs throughout the growing season, and information on land use, tenture, labor, capital and income of a typical traditional family.

PB-297 785/8 MF A01
Intermediate Technology Development Group, London (England).
Rural Africa Development Project: A Survey Technique for Identifying the Needs of Small Farmers, and an Example of Its Use in Zambia
R. D. Mann. cApr 74, 76p Rept no. ISBN-0-903031-33-7
Microfiche copies only.

Keywords: Farm management, *Zambia, Surveys, Rural areas, Africa, Problem solving, Manpower, Developing countries, Great Britain, *Agriculture, Developing country application.

The paper is written in two sections. Part I explains the need to make a survey and identify farmer's real problems before trying to introduce new techniques. Part II is a case study of the organization of a labor use survey carried out among small farmers in Zambia. The field administration of the survey is described.

PB-297 786/6 MF A01
Intermediate Technology Development Group, London (England).
Iron Foundry
Feb 75, 20p
Microfiche copies only.

Keywords: Iron and steel industry, *Foundries, Crucible furnaces, Furnace cupolas, Molding techniques, Foundry core making, Pattern making, Foundry core sands, Profiles, *Casting, Developing country application.

This booklet is designed to provide information about basic industrial skills and processes. It includes a profile of the ironfounding industry, describing the technological choices available. This profile includes information on the different levels of production equipment that can be employed; on the capital costs of equipment required for the different levels of technology; on the fuels that can be used; and on labor requirements. The bibliography will be useful to anyone starting a small-scale foundry work.

PB-297 787/4 MF A01
Intermediate Technology Development Group, London (England).
Tools for Agriculture: A Buyer's Guide to Low-Cost Agricultural Implements
John Boyd. c1976, 162p Rept no. ISBN-0-903031-22-1
Microfiche copies only.

Keywords: *Agricultural machinery, Directories, Manufacturers, Tools, Power equipment, Developing countries, Pumps, Sprayers, Plows, Great Britain, Developing country application.

The guide describes commercially manufactured small farm implements which are available for use in developing countries and gives the names and addresses of the manufacturers. It contains information on hand operated, animal drawn and small engine powered equipment.

PB-297 788/2 MF A01
Intermediate Technology Development Group, London (England).
Towards Village Industry: A Strategy for Development
Liv Berg, Krisno Nimpuno, and Roger van Zwanenberg. c1978, 87p Rept no. ISBN-0-903031-52-3
Microfiche copies

Keywords: Planning. Industries, Community development, Developing countries, *Agricultural machinery, Development, Africa, Guidelines, Great Britain, *Regional planning, *Small businesses, Villages, Developing country application.

The book deals with village industry and cottage industries in the very poorest countries, in the context of community development. The basic premise of the book is that industrialization of the rural areas in developing countries must play a vital role and that the mechanization of agricultural methods and production will have to develop in conjunction with this. Illustrations are included. Chapter topics include: rural industries; pre-capitalist industry in East Africa; petty production; the contemporary situation; village work shop design; and strategy towards village workshops.

PB-297 789/0 MF A01
Intermediate Technology Development Group, London (England).
A Manual on Building Maintenance. Volume 1: Management
Derek Miles. 1976, 80p Rept no. ISBN-0-903031-28-0
Microfiche copies only.

Keywords: *Buildings, Maintenance, Developing countries, Budgeting, Financial management, Cleaning, Renovating, Guidelines, Manpower, Materials, Equipment, Great Britain, Developing country application.

The manual sets out the guidelines for a system of budgeting and financial control of maintenance procedures in developing countries. Maintenance work is very diverse and difficult to group into clear categories for budgeting purposes. This manual will help establish efficient control procedures, including a resource budget which covers finance, manpower, materials and equipment, together with a rational and practical system for measuring output and performance.

PB-297 790/8 MF A01
Intermediate Technology Development Group, London (England).
A Manual on Building Maintenance. Volume 2: Methods
Derek Miles. c1976, 68p Rept no. ISBN-0-903031-40-X
Microfiche copies only. See PB-297 789 for volumn 1.

Keywords: *Buildings, Maintenance, Developing countries, Cleaning, Services, Maintenance, Walls, Foundations, Plastering, Painting, Roofs, Roofing, Guidelines, Methodology, Great Britain, Developing country application.

The volume deals with the basic technology of building maintenance. The function of maintenance includes three parts: cleaning and servicing, rectification and repair, and replacement. The book will assist in the examination of maintenance problems, suggesting some of the more common causes of failure and methods for dealing with these problems. The contents include: foundation, walls, plastering and rendering, paints and thin coatings, and roofing.

PB-297 792/4 MF A01
Intermediate Technology Development Group, London (England).
An Initial Course in Tropical Agriculture for the Staff of Co-Operatives
Peter Yeo. c1976, 58p Rept no. ISBN-0-903031-39-6
Microfiche copies only.

Keywords: Agriculture, Tropical regions, Soil conservation, Fertilizing, Pest control, Animal husbandry, Developing countries, Guidelines, Instructional materials, Great Britain, *Agricultural cooperatives, *Education, Developing country application, Cooperatives.

The course in this book is meant for those concerned with rural development programs in a tropical country. The course is divided into five sections: soil and the natural environment, fertilizers and plant nourishment, controlling pests and diseases, and animal husbandry I & II. At the end of each section there is a progress test with answers supplied. The book provides a sound basis of agricultual knowledge which can then be followed by practical observation.

PB-297 854/2 PC A05/MF A01
Centro de Estudias Mesoamericano sobre Technologia Apropiada (Guatemala).
Technologia Apropiada: Concepto, Aplicacion, y Estrategias (Appropriate Technology: Concepts, Application, and Strategy)
Bertha Salinas Amescua. Dec 78, 88p
Text in Spanish.

Keywords: Developing countries, Technical assistance, Technology, Development, Improvement, Planning, Rural areas, *Technology transfer, Appropriate technology, Developing country application, Villages.

An analytical description of 'appropriate technology' and its theoretical and conceptual grounds are presented. The minimal criteria used to define a technology as appropriate, the types of socioeconomic groups which develop it, and the advantages ascribed to such technology are analyzed. A discussion of the problems posed by the interdependence of the industrialized world and the third world, and the appropriate technology's image as the solution to these problems are presented. The different vested interests and the political positions of those who propose such a technology or what these groups interpret as 'appropriate technology' are detailed. Specific examples, methodology used in 'disaster areas', and proposed strategies to develop the appropriate technology concept in a beneficial manner are reported.

PB-297 856/7 PC A05/MF A01
Ministerio de Agricultura, Lima (Peru).
Quesos Andinos del Peru (Cheeses from the Andine Region in Peru)
Jose Dubach, Javier F. Pulgar, and Vidal Biber. 24 Mar 73, 90p
Text in Spanish.

Keywords: Food processing, Cheeses, *Peru, Production methods, *Milk, Fermentation, Pasteurizing, Food contamination, Developing countries, Butter, Dairy products, Equipment, Industrial plants, Cost estimates, *Food products, Developing country application.

Fundamental principles for the production of high-quality, hygienic cheeses are presented. Different physical-chemical tests for both the milk to be used and the ferment to be added are described (e.g.: acidity of the milk, density, fat determination, etc.). The principles of pasteurization and production of cheese using bacterial and enzymatic processes are explained. A detailed chart of the different ferments and their characteristics is included, as well as methods to produce yogurt, butter, and melted cheese. Diagrams for the installation of a dairy and equipment needed for a basic dairy capable of processing 400 liters of milk per day are included. Detailed cost estimates and equipment needs for a semi-industrial dairy (capacity 1200 liters), are given. A list of equipment suppliers in Peru is included. In addition, a step by step description of Tilsit type cheese and Andino type cheese are presented. Problems encountered in the ripening and fer-

mentation of the cheese, such as those produced by bacterial contamination are explained and preventive measure described. Recipes for the production of five different types of cheeses are given. Efficiency and cost estimates per type of cheese are calculated.

PB-297 857/5 PC A04/MF A01
Ministerio de Agricultura, Lima (Peru).
Quesos para Regiones Tropicales (Cheeses for Tropical Regions)
Javier Pulgar-Vidal Biber. Jan 74, 53p
Text in Spanish.

Keywords: Food processing, Cheeses, *Peru, Jungles, Production methods, Equipment, Cost estimates, Preserving, Tropical regions, Developing countries, *Food products, *Milk, Developing country application.

The method of production of fresh white cheese and ripened cheese in the Peruvian Jungle are presented. The prime material and equipment needed for each kind of cheese are described. The details and production costs are analyzed. Only milk of three percent fact has been used. Temperature conditions for the preparation of the fresh white cheese (Ucayalino), as well as methods for precipitating the protein of the milk are given. The milk used has to be preserved with hydrogen peroxide. Under tropical conditions, this cheese can be preserved for four to five days, although the preservation period can be prolonged to up to fifteen to twenty days if refrigeration is available. The ripened cheese or Provolone Amazonico has different processing conditions. Acidified milk can be used and hydrogen peroxide preservation is not needed. The preservation period for this cheese under tropical conditions is up to two months. Simpler equipment is required for this type of cheese than for the fresh white cheese. No mold, cheese cloth or presses are needed nor is it necessary to wrap the cheese. An estimate of milk needed per kg of cheese produced is given for both types of cheese.

PB-297 858/3 PC A02/MF A01
New Mexico State Univ., Las Cruces.
A Wind Energy Review: Low-Cost Machines for Agricultural and Rural Applications
Raymond A. Willem. 1978, 11p
Presented at the Conference on Energy and Agriculture in the Caribbean, Santa Domingo, November 29-December 1, 1978.

Keywords: Agricultural engineering, Well pumps, *Irrigation, Pumping, Artificial lift(Wells), Windmills, Reviewing, *Wind energy, *Water pumps, Wind power, Developing country application.

Small-scale irrigation appears to be the most effective use of wind energy in the Third World. This coincides with the fact that improving the agricultural output and living standards of the small scale farmer is one of the most pressing developmental goals in these areas. Several wind-powered water-pumping systems of an intermediate-technology level are reviewed and sources of further information are indicated.

PB-297 859/1 PC A02/MF A01
Instituto de Investigaciones Tecnologicas, Santiago (Chile).
Programa de Technolgia Rural Intermedia (Intermediate Rural Technology Program Information Bulletin)
Jul 78, 15p
Text in Spanish.

Keywords: *Food processing, Potable water, Developing countries, Fruits, Methane, Fuels, Dehydration, Drying, Rural areas, Filtration, Chile, *Water supply, *Solar energy, *Bioconversion, Developing country application, Announcement bulletins.

Description of four different 'intermediate' technology projects developed by INTEC are presented: (1) Grape drying using a solar system of natural heat transfer. (2) A bio-fuel generator, using animal excrement and vegetable refuse as sources of methane. (3) Home-made solar dehydrator for agricultural products. (4) Construction of a sand filter for water purification in rural zones. Each succinctly described project is accompanied by a construction diagram. This publication also lists a large number of available intermediate technology project descriptions, which can be obtained by writing to INTEC. The addresses of international organizations that have a compiled bibliography of this type of simple technology are included.

PB-297 860/9 PC A03/MF A01
Volunteers in Technical Assistance, Mt. Rainier, MD.
Alternative Energy Technologies in Brazil
J. M. F. Miccolis. Feb 77, 31p

Keywords: *Brazil, *Solar energy, Fuels, Ethyl alcohol, Charcoal, Wood, Hydrogen, Shale oil, Reviewing, *Energy source development, Ocean Thermal energy conversion, *Bioconversion, Hydrogen economy, Energy conservation.

The possibilities for developing alternative energy technologies in Brazil are many and varied. Some of them are peculiar to the country; others are applicable elsewhere. This report outlines many possibilities, such as solar energy, water power, and bio-conversion of waste and concludes that a very well-coordinated and executed comprehensive approach toward the problem will be required.

PB-297 865/8 PC A09/MF A01
IDI Research, Inc., Cincinnati, OH.
Estudio Sobre Fertilizantes (Study on Fertilizers)
1981, 196p
Text in Spanish.

Keywords: *Fertilizers, Developing countries, *Latin America, Materials, Prices, Supply(Economics), Demand(Economics), Nitrogen, Soil analysis, Soil chemistry, Argentina, Chile, Uraguay, Paraguay, Bolivia, Production methods, Production planning, Marketing, Manufacturing, Industries, Cost estimates, Developing country application.

An evaluation of the existing fertilizer materials in the world, and of the exports of the main producing countries are presented. A discussion of the situation of fertilizers in Latin America, prices, supply and demand, role of nitrogen in the fertilizer industry, and of the types of fertilizers in agriculture are offered. A chemical analysis of the soil types in the area of interest (Argentina, Chile, Uraguay, Paraguay, and Bolivia) and recommendations of the appropriate fertilizer needed for each area as well as an evaluation o the agricultural potentials of these areas are included. An analysis of the potential market for fertilizers, the prime location for a fertilizer factory, types of production processes to be employed, and the distribution nets to be established, as well as an estimate of capital to be invested, and total production costs and gains are presented.

PB-297 866/6 PC A08/MF A01
Dakar Univ. (Senegal).
L'Energie Solaire, Sur Les Energies Nouvelles (Solar Energy, about New Energies)
Malu Wa Kalenga, and Isengingo Kambere Ng'Ise.
20 Jan 79, 156p
Text in French.

Keywords: *Solar energy, Solar cells, Photosynthesis, Pumping, Insolation, Heating, Zaire, Senegal, Niger, Ivory Coast, *Energy source development, *Bioconversion, *Tidal energy, Developing country application, *Geothermal energy, Wave power.

The uses of solar energy are extensively covered in this highly technical, thorough treatise. Geothermal energy and energy of the waves are briefly examined as other possible renewable, universal, clean sources of energy. Physical, thermodynamic and quantum-chemical properties are analyzed and applied to various transformations: (1) Electrical transformations and industrial applications (photo-electric cell, photovoltage cell, semiconductor). Se, Si and Ge are examined as sources of photosensitive semiconductors. (2) Transfer to chemical energy (photochemical preparation of chemicals, electrolyses of water using photosensitive semiconductors). Photo-synthesis is extensively treated as a source of both food and fuel (Combustion, pyrolysis, aerobic- and anaerobic fermentation). In the second part of the book solar energy is applied in Zaire in a program to: (1) Measure the amount of solar energy at 12 different stations. Results per station are reported, using graphs. (2) Attempts to receive T.V. (3) Attempts to transmit T.V. (4) Attempts to pump water. (5) To heat. Future programs for Zaire, Senegal, Niger and the Ivory Coast are listed. Other countries that have shown an interest in solar energy are briefly listed.

PB-297 867/4 PC A03/MF A01
Instituto de Investigaciones Tecnologicas, Bogota (Colombia).
Elaboracion de la Panela (Production of 'Panela' or Brown Sugar Cakes)
1984, 48p
Text in Spanish.

Keywords: *Food processing, Nutrients, Production methods, Sugarcane,-Developing countries, *Colombia, *Sugar, Developing country application, Brown sugar.

Methods used in the production of 'Panela' (brown sugar cakes) are presented. A comparison between the nutrients in panela and in refined sugar is included. Quality requirements for different grades of brown sugar in terms of color, turbidity, saccharose and protein content are given. Yield estimates per 1000 kg of sugarcane juice are included. The processes of cane cutting, juice extracting, clarifying (through the addition of monocalcium phosphate, adjusting of pH, and removal of impurities and agglutinates) and the final molding into panela cakes and packaging are depicted. Different types of sugarmill designs, appendices itemizing the terms used in this industry and yield data for different extraction methods are included. A comparison is made between real and artificial panela (consisting of sugar and aniline), in terms of physical and chemical properties.

PB-297 868/2 PC A02/MF A01
Direccion General Forestral, San Jose (Costa Rica).
Reforestacion (Reforestation)
Dick Lemckert, and Luis Gmo. Rodriguez. Feb 78, 19p
Text in Spanish.

Keywords: Reforestation, Developing countries, Erosion control, Droughts, Spanish language, Cost estimates, Planting, Cutting, Plants(Botany), Forest trees, Operations, Foreign countries, *Forestry, Developing country application, Small farms.

Reforestation as a method to control erosion and droughts is presented. Planting techniques and soil preparation methods are described step by step. A list of foreign and local tree species suitable for reforestation purposes in this geographical area (Pacific zone, 0-800 m. above sea level), and a diagram describing each step of the operation are included. Appropriate planting and pruning periods are indicated. Cost estimates for the planting operation are provided, personnel and materials needed per hectare for the different steps in the operation are described, and expected returns for the grown trees are calculated. A 12% gain over invested capital is expected. The report is suited to the available resources in underdeveloped countries. It is described in a clear, concise manner, and is suitable for use by small farmers or as a community project.

PB-297 869/0 PC A05/MF A01
Ministerio de Recursos Naturales, Tegucigalpa (Honduras).
Technologia para Campesinos Hondurenos Informe de un Seminario (Small Farmer Technology for Honduras-Seminar Report)
May 78, 82p
Text in Spanish.

Keywords: Developing countries, Farms, *Honduras, Education, Technology, Government policies, Upgrading, Project planning, *Agriculture, Developing country application, Small farms.

A discussion of appropriate technology programs applied to Honduras, the objectives of such programs, the needs of the small farmer, and his degree of participation in such programs, the role of education and training, the general program structure, and the role of the government are presented. The results of the discussions at this small farmer technology seminar and the conclusions arrived at in terms of problems to be solved by intermediate technology and ways of updating the skills of the target group are included.

PB-297 870/8 PC A02/MF A01
Instituto de Investigaciones Tecnologicas, Santiago (Chile).

Secado Solar de Uvas, Programa de Technologia Rural Intermedia (Solar Drying of Grapes, Intermediate Rural Technology Program)
Jul 78, 12p
Text in Spanish.

Keywords: Solar radiation, Drying, Grapes, Developing countries, Alkalinity, Chemical properties, Sodium hydroxide, Evaporation, Color, Structures, Construction, Food processing, Marketing, *Chile, Seeds, Objectives, Spanish language, Diagrams, Rural areas, *Solar drying, *Fruits, Developing country application, Raisins.

A new method to accelerate the drying of purple and yellow grapes using a short preliminary chemical treatment is described. By breaking up the skin through a very short immersion in alkaline solution, the evaporation of water is speeded up and the drying time is cut from 90 days to 20 days. To preserve the light color in yellow grapes, an additional sulfur treatment is needed [illegible] metic reactions in the grape skin respon- [illegible] k pigmentation. A diagram describing [illegible] of an appropriate structure for the [illegible] given. Information on the internation- [illegible] ne raisins and prices per ton paid during the years [illegible] 1-1976 are provided. A simplified step by step diagram of the whole process, listing objectives of each step, is supplied.

PB-297 958/1 PC E04/MF A01
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Laboratory Procedures for the Diagnosis of Intestinal Parasites
Dorothy M. Melvin, and Marion M. Brooke. Feb 79, 183p* Rept nos. HEW/CDC/BL-79/0007, DHEW/PUB/CDC-79-8282

Keywords: Diagnosis, Parasites, Gastrointestinal diseases, Manuals, Intestines, Procedures, Public health, Examination, Serology, Cultivation, Collection, Methodology, Cultures(Biology), Quality control, Evaluation, Microscopy, Concentration(Composition), Staining, *Diseases, Medical laboratories, Specimens, Preservation.

The manual contains information on proper collection and handling of specimens. Laboratory results for parasitic examination and 'cookbook' directions for performance of direct concentration, staining and miscellaneous procedures used in diagnosis of intestinal parasites.

PB-297 959/9 PC A03/MF A01
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Common Blood and Tissue Parasites of Man; Life Cycle Charts
D. M. Melvin, M. M. Brooke, G. R. Healy, and K. W. Walls. 1979, 46p* Rept no. HEW/CDC/BL-79/0006

Keywords: Parasites, Manuals, Blood, Humans, Tissues(Biology), Life cycles, Malaria, Nematoda, Protozoa, Sporozoa, Amoeba, Host(Biology), Characteristics, *Diseases, Cestoda, Helminths, Hemoflagellates, Host parasite relations.

The manual contains charts of the life cycles of 18 parasites commonly found in the blood and tissues of man. The two groups of parasites - those found in the blood and those found in the tissue - are discussed. The charts in the manual are for use by students of parasitology, laboratory personnel, public health workers, and physicians.

PB-297 962/3 PC A03/MF A01
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Morphology of Diagnostic Stages of Intestinal Parasites of Man
M. M. Brooke, and D. M. Melvin. 1978, 33p* Rept nos. HEW/CDC/BL-78/0002, DHEW/PUB/CDC-79-8116

Keywords: Morphology, Gastrointestinal diseases, Diagnosis, Manuals, Parasites, Humans, Characteristics, Examination, Intestines, Protozoa, Amoeba, Ciliata, Nematoda, Trematoda, Tables(Data), *Diseases, Helminths, Cestoda, Host parasite relations.

Morphologic characteristics of the diagnostic stages of intestinal parasites of man presented in tabular form with accompanying drawings. The report is intended as a manual for ready reference by technologists doing parasitologic examinations.

PB-298 036/5 PC A04/MF A01
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Nepal
Jan 79, 66p

Keywords: *Economic development, *Nepal, Foreign aid, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application, Agency for International Development.

The document outlines the economic situation in Nepal and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 037/3 PC A04/MF A01
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Sri Lanka
Jan 79, 72p

Keywords: *Economic development, *Sri Lanka, Foreign aid, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Sri Lanka and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 038/1 PC A04/MF A01
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Tanzania
Jan 79, 68p

Keywords: *Economic development, Foreign aid, *Tanzania, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Tanzania and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 058/9 PC A03/MF A01
Ministerio de Agricultura y Ganaderia, Soyapango (El Salvador). Servicio de Recursos Pesqueros.
Evaluacion Pesquera en el Lago de Ilopango y la Laguna de Olomega, 1977. Volume V, No. 5 (Fishing Evaluation of Lake Ilopango and the Olomega Lagoon, 1977. Volume V, No. 5)
Ricardo Alfredo Castro Aragon, and Jose Francisco Godinez. Oct 78, 42p
Text in Spanish.

Keywords: Fishing grounds, Plankton, Lake Ilopango, Olomega Lagoon, Water pollution, Feasibility, Eggs, Soils, Aquatic plants, Oxygen, Dissolved gases, Spanish language, Marketing, Sedimentation, Insecticides, *El Salvador, *Fisheries, Developing country application, Water levels, Eutrophication.

A feasibility report for fish culture in Lake Ilopango and the Olomega Lagoon was undertaken from May 24 to July 23, 1977. In Lake Ilopango, fishing was performed in the miry (muddy) soil area and in the organic matter area as well as in the sandy soil and rocky area. In the Olomega Lagoon, fishing took place in the miry soil and organic matter (dead plants, etc.) area. The fish caught were measured, weighed, and counted. Fish obtained from the Olomega Lagoon were dissected to determine their egg content and choose the best size fish to be kept. Nets with different mesh values were used and evaluated for their efficiency. Different species existing in each lake are listed. The authors list several problems encountered in the Olomega Lagoon. Problems in marketing due to commercial monopoly of fish caught and of fishing equipment are cited, as well as high insecticide level in the waters, low water level in the lagoon area, large amounts of Eichornia (aquatic plant), the latter two being responsible for low O2 concentration and consequent death of the fish population.

PB-298 059/7 PC A02/MF A01
Ministerio de Agricultura y Ganaderia, Soyapango (El Salvador). Servicio de Recursos Pesqueros.
Estudio Limnologico Preliminar de la Laguna de Aramuaca. Vol. II, No. 1 (Preliminary Limnologic Study of Lake Aramuaca. Vol. II, No. 1)
Jose Francisco Godinez, and M. S. Andre DeGeorges. Jan 75, 24p
Text in Spanish.

Keywords: Fishing grounds, Biomass, Plankton, Lake Aramuaca, Water pollution, Concentration(Composition), Hydrogen sulfide, Carbon dioxide, Oxygen, Dissolved gases, Spanish language, Turbidity, Limnology, Temperature, *El Salvador, *Fisheries, Developing country application.

The chemical, physical, and biological studies of Lake Aramuaca were carried out in September 1974 (rainy season). It was observed that the lake of volcanic origin, has a reduced production of plankton and a chemical and thermal stratification occuring mainly at the lake's surface. It was concluded that the existing chemical and physical parameters encountered during the rainy season are unfavorable for the use of this lake as a fishing ground. High turbidity of the water, high alkalinity, and water hardness as well as unfavorable levels of CO2, H2S, O2, and SO4(--) make this lake's waters harmful to the organisms that could live there.

PB-298 060/5 PC A06/MF A01
Ministerio de Agricultura y Ganaderia, Soyapango (El Salvador). Servicio de Recursos Pesqueros.
Contribucion al Conocimiento Limnologico Comparativo del Lago de Guija en la Epoca Lluviosa de 1973 y Epoca Seca de 1974. Volumen II, No. 9 (Contribution to the Comparative Limnologic Knowledge on the Guija Lake in the 1973 Rainy Season and the 1974 Dry Season. Volume II, No. 9)
Technical rept.
Franklin Americo Lopez, Jose Francisco Godinez, and M. S. Paul Andre DeGeorges. Sep 75, 106p
Text in Spanish.

Keywords: Fishing grounds, Plankton, Guija Lake, Water pollution, Limnology, Concentration(Composition), Aquatic plants, Benthos, Graphs(Charts), Tables(Data), Spanish language, *El Salvador, *Fisheries, Developing country application, Eutrophication.

A limnologic study of the Guija Lake at the end of the dry season (April 1974) was undertaken. One of the main objectives is to collect data to be compared to earlier data. During the previous rainy season (May-Sept 1973), physical, chemical, and biological parameters were determined for this lake in the dry season. Phytoplankton, zooplankton, and benthos (organisms like mollusks, etc.) at different depths were examined. The authors find noteworthy differences in the dry vs. rainy season parameters. During the dry months, partial stagnation of the lake is noticeable. In the period from November to February, the colder air and the wind lead to a mixture of the top layer of the water, which used to be warm, with the lower layer resulting in an inversion of water layers. This causes a remarkable (50%) lowering of the planktonic population due to a parallel lowering of available chemical nutrients. The authors recommend the rainy season as the best for seeding of the Tilapia Aurea. Graphs and tables comparing all of the studied parameters are included.

PB-298 061/3 PC A03/MF A01
Ministerio de Agricultura y Ganaderia, Soyapango (El Salvador). Servicio de Recursos Pesqueros.
Estudios Limnologicos Preliminares de la Laguna Verde. Volumen II, No. 4 (Preliminary Limnologic Studies of Laguna Verde. Volume II, No. 4)
Jose Francisco Godinez, and M. A. Andre DeGeorges. Aug 75, 34p
Text in Spanish.

Keywords: Fishing grounds, Biomass, Plankton, Laguna Verde, Water pollution, Concentration(Composition), Hydrogen sulfide, Carbon dioxide, Oxygen, Dissolved gases, Turbidity,

Limnology, Temperature, *El Salvador, *Fisheries, Developing country application, Thermal pollution.

The report describes an evaluation of the available biomass in Laguna Verde as well as physical chemical characteristics of this lake and determination of its feasibility for exploitation for fishing purposes were carried out in October 1974. Physical parameters i.e. visibility, conductivity of the water, turbidity, and temperature were studied. Chemical parameters i.e. H2S, CO2, and O2 concentration, pH, alkalinity, and water hardness were measured at three different stations in Laguna Verde. Biological studies of the zooplankton and phytoplankton encountered were carried out. Soil samples were also analyzed. An error analysis is included. Tables containing all experimental results and a comparison with measurements of previous years are given. The authors concluded that at the time of the study (dry season) the lake was in it's homothermal phase. A high plankton concentration and a scarce ichthyological population were observed. It is also concluded that under the observed conditions, this lake is not really suited as a fishing ground during that season.

PB-298 083/7 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Ghana
Jan 79, 57p

Keywords: *Economic development, Foreign aid, *Ghana, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Ghana and development plans of the Ghana Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III the assistance planning levels. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 084/5 PC **A03**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Philippines
Jan 79, 39p

Keywords: *Economic development, Foreign aid, *Philippines, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in the Philippines and development plans of the Philippines Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III the assistance planning levels. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 085/2 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Indonesia
Jan 79, 67p

Keywords: *Economic development, Foreign aid, *Indonesia, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Indonesia and development plans of the Indonesian Government. Part I of this study gives an analytical description of the poor. Parts II and III give the strategy and cites the assistance planning level. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 086/0 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Sudan
Jan 79, 61p

Keywords: *Economic development, Foreign aid, *Sudan, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Sudan and development plans of the Sudan Government. The first six portions of this study outline the needs of this country. Chapter VII outlines the AID program strategy. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 090/2 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Bangladesh
Jan 79, 68p

Keywords: *Economic development, Foreign aid, *Bangladesh, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The economic structure of Bangladesh is discussed as well as the measures planned by the Government to improve the situation. AID objectives are outlined to assist in upgrading the general economic picture. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 091/0 PC **A03**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Pakistan
Jan 79, 50p

Keywords: *Economic development, Foreign aid, *Pakistan, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Pakistan and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 092/8 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, 1981-1985. USAID/Kenya
Jan 79, 60p

Keywords: *Economic development, Foreign aid, *Kenya, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Kenya and development plans of the Kenya Government. Part I of this study gives an analytical description of the poor. Part II gives the strategy and Part III cites the assistance planning level. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 117/3 PC **A05**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Thailand
Jan 79, 100p

Keywords: *Economic development, Foreign aid, *Thailand, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Thailand and development plans of the Royal Thai Government. The second and third portion of this study outline the AID program strategy for this country. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 118/1 PC **A04**/MF **A01**
ACTION /Peace Corps, Washington, DC. Information Collection and Exchange.
Lesson Plans for Beekeeping
Program and training journal reprint series
Diana Sammataro. Apr 78, 67p Rept no. REPRINT SER-32

Keywords: *Bees, Specialized training, *Philippines, Developing countries, Planning, Equipment, Protective clothing, Agriculture, Manuals, Marketing, Developing country application, Beekeeping, Reprints.

The brochure was prepared for the Bee Training Seminar at National Rural Life Center, Palapala, Cavite, Philippines. It contains eight lesson plans--Construction of equipment necessary for beekeeping; requirements for and obtaining bees; handling bees; colony management/seasonal manipulations; the bee colony and races of bees; problems in Philippine beekeeping; selection and rearing of queens for stock improvement; marketing hive products.

PB-298 120/7 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Country Development Strategy Statement, FY 1981. Cameroon
Jan 79, 63p

Keywords: *Economic development, Foreign aid, *Cameroon, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The economic situation in Cameroon is discussed as well as the Government's plans for future development. Parts 2 and 3 of the report outline AID's objectives and the proposed assistance planning levels. This strategy statement has been prepared by the AID field mission. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 121/5 PC **A03**/MF **A01**
Agency for International Development, Washington, DC.
Small Program Statement. Tunisia
Jan 79, 38p

Keywords: *Economic development, Foreign aid, *Tunisia, *Technical assistance, Federal assistance programs, Planning, Developing countries, Project planning, Developing country application.

The document outlines the economic situation in Tunisia and presents the AID program strategy for this country. It is prepared annually and used for planning purposes in the field and in Washington.

PB-298 341/9 PC **A02**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Reducing Postharvest Losses of Fish in the Third World
E. R. Pariser. c1979, 9p MITSG-79/11J, NOAA-79061806

Keywords: Harvesting, *Food processing, Losses, *Fishes, Developing countries, Food deterioration, Capitalized costs, Investments, Upgrading, Food storage, Roads, Trucks, Reprints, Sea Grant program, Global.

The National Academy of Sciences conducted a study of the global problem of hunger and malnutrition. The study determined that postharvest fish loss, especially in less-developed countries, is the result of a vicious circle of cause and effect. The Academy study concluded that aid to artisanal fishermen in less-developed countries should come through projects in the general areas of technology, extension (training), and infrastructure (public works and capital investment). It recommended that technological aid be administered through government research and development institutes rather than through universities. Finally it recommended capital investment to upgrade fish marketing and storage areas, water supplies, sanitation, and

sewage facilities. In addition, it said that postharvest food losses could be substantially reduced through provision of newer trucks and better roads.

PB-298 423/5 PC A15/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Tropical Legumes: Resources for the Future
Final rept.
Aug 79, 343p* Rept no. CIR/BOSTID-79/25
Contract AID/csd-2584
Library of Congress catalog card no. 79-64185.

Keywords: *Agricultural economics, Tropical regions, Leguminous plants, *Crops, *Plants(Botany), Farm crops, Developing countries, Bacteria, Nitrogen fixation, Taxonomy, Economic development, Acclimatization, Structural timber, Wood, Forest trees, Requirements, Rice plants, Forage crops, Proteins, South Africa, Bean plants, Nut trees, Ornamental plants, Afrormosia elata, Dalbergia frutescens, Dalbergia nigra, Intsia bijuga, Pterocarpus soyauxii, Pterocarpus dalbergioides, Carob trees.

This report describes plants of the family Legumimosae, all of them greatly underexploited. Some are extensively used in one part of the world but unknown elsewhere; others are virtually unknown to science but have particular attributes that suggest they could become major crops in the future; a few are already widespread but their possibilities are not yet fully realized. Most of the plants described in the book have the capacity to provide their own nitrogenous fertilizer through bacteria that live in nodules on their roots, and generally require no additional nitrogenous fertilizer for average growth. The object of the book is to show how little-known legumes can contribute to the economies of developing countries.

PB-298 451/6 PC A04/MF A01
University of Manchester Inst. of Science and Technology (England). Dept. of Textile Technology.
Manual de Instrumentacion y Control de Calidad en la Industria Textil (Manual for Instrumentation and Quality Control in the Textile Industry)
Development and transfer of technology series no. 4
R. Nield. 1978, 57p
Text in Spanish.

Keywords: Manuals, *Textile industry, Textiles, Tests, Humidity, Quality control, Fibers, Fabrics, Torsion, Traction, Laboratories, Physical properties, Chemical properties, Developing countries, Developing country application, Industrial development.

General aspects of textile testing are discussed, in particular, problems caused by the humidity of test samples. The need for atmospheric control in testing laboratories is stressed. Methods to carry out mass and humidity measurements and preliminary treatment of textile samples are given. Guidelines for the consistent testing of textiles and for quality control are included, as well as methods to measure fiber torsion and traction. The mechanical, physical, chemical and physicochemical properties of fibers, threads and fabrics are discussed, as well as testing methods for each of these properties (e.g. permeability, fiber structure, wrinkle resistance, etc.). Properties of textile floor coverings are also considered. Functions to be performed by chemical and physicochemical pilot-plants are outlined. Three appendices are included: Appendix I lists the instrumentation needed by factories and textile labs for testing; Appendix II list suppliers of such instrumentation in several countries (mainly in Europe and in the U.S.A.); Appendix III gives a selection of appropriate units and magnitudes, recommended for the measurement of textile properties.

PB-298 470/6 PC A05/MF A01
Instituto Geografico, Bogota, Colombia.
Los Suelos - Su Uso y Manejo. Cartilla Divulgative para el Agricultor Colombiano (Soils - Their Use and Management. Primer for the Colombian Farmer)
Cecilia Bejarano de Carvajal, Hernan Cordoba E, and Myriam Acevedo Ro. 1978, 88p
Text in Spanish. Sponsored in part by Federacion Nacional de Cafeteros de Colombia, Bogota.

Keywords: Soil properties, Developing countries, *Soils, *Colombia, Rock, Sampling, Porosity, Nutrients, Concentration(Composition), Soil texture, Soil fertility, Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Spanish language, Developing country application.

Soil composition and its importance as a natural resource is explained in simplified form for Colombian farmers. The significance of visible and unseen properties, which make one soil differ from another and which determine its quality and use, is discussed. Soil, subsoil and rock are analyzed and their interrelationship shown. Soil color, texture, structure porosity, permeability, true depth and drainage are portrayed in line drawings and color illustrations (black and white in reproduction). The chemical properties of soils and the influence on soil fertility of the major nutrients, nitrogen, phosphorous, potassium, calcium and magnesium is emphasized. Minor nutrients are listed, and methods of collecting soil samples for laboratory analysis are presented. The principal causes of soil destruction are illustrated, and preventive measures are recommended.

PB-298 481/3 PC A09/MF A01
National Research Council, Washington, DC.
Plantas Tropicales Subexplotadas con Valor Economico Prometedor (Under-Exploited Tropical Plants with Promising Economic Value)
1975, 197p
Text in Spanish.

Keywords: *Plants(Botany), Developing countries, *Agricultural economics, Tropical regions, Market value, Grasses, Grain crops, Vegetables, Bean plants, Fruit crops, Oilseed crops, Forage crops, Livestock, Feeding stuffs, Root crops, Leguminous plants, Requirements, Spanish language, Developing country application, Underexploited plants.

The report is on plants that show promise for improving the quality of life in tropical areas. The report aims to provide a brief introduction to the plants selected. It is neither a textbook nor a comprehensive study of tropical botany. The report does not detail how to introduce the plants to new areas. Readers should appreciate that achieving this goal may be complex and difficult. Many plants discussed in this report have defied dissemination (or domestication) for a century or more. Plant introduction cannot be divorced from plant management; a lack of horticultural knowledge or experience will frequently cause a plant introduction to fail. Differences in elevation, soil type, temperature, day length, and rainfall present other complications. Sometimes newly introduced plants prove to be too aggressive and become weeds. Even if all these problems are overcome, the plant will be successful only if a market exists or can be created.

PB-298 525/7 PC A02/MF A01
Grupo de Tecnologia Apropiada, Panama City (Panama).
Tecnologias Apropiadas para el Desarrollo de Panama (Appropriate Technology for the Development of Panama)
Jose Jorge Bonamico. Apr 79, 20p
Text in Spanish.

Keywords: *Industrial development, *Panama, Technology, Developing countries, Guidelines, Manufacturing, Food processing, Rural areas, Refineries, Sugars, Cements, Planning, Developing country application, Appropriate technology.

A theoretical document explaining what appropriate technology is, and establishing guidelines to implement such technology in Panama is presented. A brief analysis of the economic and social development of the Canal Zone vs. the rest of Panama, during the years 1970-1980 is given. The authors discuss the strategy to be followed during the decade of 1980-1990, using appropriate technology to solve some of the problems encountered. The areas where such technology can be used are classified as: Traditional rural activities (tool manufacturing, food production); Slightly more complex activities (production of cement, sugar refining); and Activities especially designed to take advantage of and to develop existing natural and human resources.

PB-298 564/6 PC A09/MF A01
Instituto Mexicano del Seguro Social, Mexico City.
Guia de Tecnicas de Promocion en Accion Comunitaria y Saneamiento Rural (Guide to Promotional Techniques in Community Action and Rural Sanitation)
Francisco Alarcon Navarro, Hiram Bravo Barrientos, and Rafael Ibanez Cabrera. 1973, 197p
Text in Spanish.

Keywords: Sanitation, Rural areas, Promotion, Public relations, Health, Community development, Cooperation, Citizen participation, Planning, *Waste disposal, Sanitary engineering, *Water supply, Housing studies, Mexico, Developing countries, Developing country application.

Methods of approach and solution to community problems of rural Mexico are analyzed in this two-part study. Part One presents methods of evaluation of the physical, political, economic and social aspects of the community relative to health education and promotion of sanitation. Rapport with community leaders - priests, schoolteachers, doctors, medical assistants and social workers - is essential to a successful program, and methods of gaining cooperation are recommended. Community and agrarian organisms, such as communal groups (ejidos), are suggested as basic forums for the promotion of programs for change. The study details procedures of organizing and motivating the community. Part Two deals with techniques of rural sanitation. Methods of disposal of garbage, animal and human wastes are presented. Health problems in contaminated living areas are discussed, and sanitary procedures are recommended. A further consideration in Part Two is community water supply and its collection, storage and handling. The final section of the study consists of recommendations for improvement of living quarters in the rural hut (choza). Eighty-four illustrations are included in Part Two, giving design, specifications and materials needed for construction of garbage pits, sanitary land fills, incinerators, sewer systems, rural water plants and domestic water supply systems.

PB-298 643/8 PC A03/MF A01
Department of Agriculture, Washington, DC.
Industrias Quimica S.A. A Proposed Plant to Produce Sulphuric Acid in Panama
Morris Solomon. 19 Apr 63, 45p

Keywords: *Industrial plants, *Panama, *Chemical industry, Manufacturing, *Sulfuric acid, Requirements, Production management, Operating costs, Materials estimates, Equipment, Market surveys, Financial management, Cost estimates, Labor estimates, Developing country application.

The brochure takes into account the domestic consideration, nature and state of the market in Panama. Then it proceeds to delve into the building of a sulphuric acid plant citing land cost, building, furniture, insurance working capital, taxes, maintenance, labor, etc. Numerous charts given at the back of the work show a breakdown in every phase of the project.

PB-298 717/0 PC A12/MF A01
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Como Obtener Informacion en Diferentes Campos de la Ciencia y la Tecnologia: Una Guia para el Usuario (How to Obtain Information in Different Fields of Science and Technology: A User's Guide)
Lecture series.
May 74, 271p Rept no. AGARD-LS-69
Text in Spanish.

Keywords: *Information sources, Information centers, Data processing, Information systems, Documentation, Information retrieval, Methodology, Meetings, Developing country application.

The purpose of the report is to outline for the user of information systems the principles upon which such systems are based, enabling him to understand and more readily exploit their potentialities. It includes presentations of general information on this subject and more detailed examples of specific scientific, medical and governmental systems.

PB-298 774/1 PC A12/MF A01
Dar es Salaam Univ. (Tanzania). Electric Power Lab.
Rural Electrification and Windpower in Tanzania
Research rept.
Roland Reichel. Mar 78, 253p Rept no. EP-7

Master's thesis.

Keywords: *Electric power, Electric power distribution, Wind power generation, *Wind energy, *Turbines, *Tanzania, Rural areas, Electric power damand, Developing countries, Windmills, Design criteria, Theses, Wind turbines, Wind power plants, Developing country application, Windpowered generators.

Present rural electrification in Tanzania means supplying electricity to townships and to only a few of the existing 8000 registered villages, which are not yet electrified in any considerable numbers due to technical and economical problems. The initial deman is normally low and the distances are too great to justify the expenses of transmission lines. Thus individual power stations seem to be the only alternative. Demand figures for typical villages are evaluated, and compared to data from Europe. Out of the alternative sources of energy only one, the WIND ENERGY, is described in some detail. Some windpower theory and brief explanations of windpower terms are given. The status of current windpower-research is described including a list of past and present prototypes. Based on commercially manufactured WIND ENERGY SYSTEMS and careful cost estimations and calculations, two wind energy supply schemes are proposed: one is for a telecommunication link and the other for a complete village power station of 45 kW rated out-put. The power station based on wind-energy was found to deliver the electricity at prices cheaper than the diesel-based scheme and, under certain conditions, working profitable if current electricity selling prices in Tanzania are considered. Operating and design criteria are discussed.

PB-298 837/6 PC A07/MF A01
International Labour Organisation, New York.
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Transport Facilities for the Rural Sector in Developing Countries
Background paper
I. J. Barwell, and J. D. Howe. 27 Oct 78, 139p
Report of Working Group No. 12, Appropriate Technology for Rural Transport.
See also PB-297 663/7.

Keywords: *Transportation, Developing countries, Rural areas, Facilities, Vehicles, Marketing, Farms, Roads, Bicycles, Motorcycles, Policies, Recommendations, Rural transportation, Developing country application.

The report is concerned with the provision of appropriate transport facilities in the rural areas of developing countries. It is argued that the technologies applied in the past have been inappropriate to, and ineffective in meeting the transport needs of their poorest people. Further, there are alternative and more appropriate transport technologies which can better meet many of these needs. An essential element of any strategy for improving the transport capabilities of rural populations must be to provide a graduated choice of vehicles whose performance matches need and whose cost is in sensible relation to income. A range of basic vehicles is described--from aids to goods movement by man through to cheap motorized forms of transport--whose technology is shown to be more appropriate to the needs of many rural developing communities. Throughout the report various actions to promote more appropriate rural transport are identified. These are summarized into three categories: information, research and development; and production and marketing.

PB-298 838/4 PC A02/MF A01
Swedish International Development Authority, Stockholm.
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Lime Burning and Alkaline Pulping
Background paper
J. Leffler. 3 Oct 78, 23p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: Manufacturing, *Calcium oxides, *Pulp, *Industrial plants, Pulp mills, Sulfates, Sodium inorganic compounds, Bamboo, Cost estimates, Consumption, Kilns, Requirements, Developing countries, Rural areas, Paper products, Pulping, Developing country application, Lime.

The paper is divided into two parts. The first one describes the consideration taken in a particular case to choose an appropriate installation for lime burning in a developing country in connection with an alkaline sulphate pulp mill based on bamboo. The mill site is situated in a rural area of the country, which is intended to be industrialized. The second part gives some cost estimates, consumption, and efficiency figures covering lime kilns in general. As the prerequisites in this case study mainly differ from the situation if wood is the fibre raw material, if the infra-structure and technical experience have been well established for long time, etc., the choice of lime burning cannot be conventional. The paper is based on own experiences and information and advice which the author has gotten from textbooks, other technical reports and brochures and also valuable discussions with lime kiln manufacturers, lime producers, and pulp producers.

PB-298 839/2 PC A03/MF A01
Intermediate Technology Development Group, London (England).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Energy for Rural Requirements
Background paper
P. D. Dunn. 3 Oct 78, 40p
Report of Working Group No. 11, Appropriate Technology for Rural Energy.
See also PB-294 602/8.

Keywords: Energy, *Energy source development, Rural areas, Developing countries, Trends, Constraints, Recommendations, Reviewing, Energy requirements, Developing country application, Energy sources.

This report discusses the energy use and needs in the rural areas of developing countries and summarizes the sources of energy and the current state of the art in energy conversion. Most emphasis is given to the problems impeding the implementation of new energy sources and conversion devices. Some successful developments in this field are described and some guidelines laid down for future programs.

PB-298 840/0 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Industrial Technology Application in the Pulp and Paper Industry in the Philippines
Background paper
J. O. Escolano, and F. N. Tamolang. 4 Oct 78, 29p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Paper, Manufacturing, Paper products, *Pulp, Pulping, Hardwoods, Pulp mills, Paper making, Paper industry, Developing countries, *Philippines, Developing country application.

Pulp and paper research and development work conducted at the Forest Products Research and Industries Development Commission (FORPRIDECON), Philippines during the past years have shown the technical feasibility of using indigenous materials (not only from traditional but also from non-conventional sources), for the production of different types of pulp and paper products, using suitable pulping processes. Practical experience in the Philippines has also demonstrated that appropriate technologies can be successfully applied in commercial operations both in the categories of small pulp mills and large-scale activities, depending on the raw materials used.

PB-298 845/9 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Opportunities for Technical Co-Operation between Developing Countries for Producing Building Materials
Background paper
N. R. Hill. 4 Oct 78, 36p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: *Building materials, *Cement, *Concrete, Developing countries, Construction materials, Surface mining, Pozzolans, Concrete blocks, *Bricks, Tiles, Kilns, Construction industry, Manufacturing, Fabricating, Developing country application.

Existing appropriate methods being used are described and technological gaps are identified in some examples from processes related to the manufacture of building materials at the simplest levels. The processes and materials covered include small scale surface mining methods, pozzolanas, concrete blocks, clay bricks and tiles, lime kilns, and small scale cement plants.

PB-298 846/7 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in Production of Cane Sugar
Background paper
B. A. Bhat, and F. Duguid. 29 Sep 78, 61p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar.

Keywords: *Industrial plants, Manufacturing, *Sugar, Developing countries, Consumption, Statistical data, Sugarcane, Production methods, Machinery, Employment, Molasses, Industries, Profits, Sugar industry, Developing country application.

Described in this paper are alternative sugar production processes, products and their by-products. Some production, trade and consumption statistics to illustrate the likely future importance in the industrialization policies of many LDC's are also included. A brief discussion considers the more important agricultural aspects of sugar cane production, emphasizing the necessarily close relationship with factory operations. Identified are alternative techniques at each major sub-process for two technology types--open-pan and vacuum pan. Briefly discussed are sources of equipment for both technologies. An evaluation is given of a number of alternative technologies based on stated assumptions on season length, operating parameters and cost data. Relevant policy implications and options are presented. An appendix offers a list of suppliers of turnkey packages and specialist equipment for both small-and large-scale technologies and a number of consulting firms.

PB-298 863/2 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Cane Sugar Techniques in Developing Countries
Background paper
J. M. Paturau. 2 Oct 78, 67p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar.

Keywords: *Sugar, Manufacturing, Sugarcane, Production methods, Economic development, Technology innovation, Tropical regions, Sugar crops, *Industrial plants, Developing countries, Mauritius, Developing country application, Sugar industry.

The main physical constraints of cane sugar production are briefly described and the sugar production objectives to ensure socio-economic development are considered. Alternative methods of production are compared and possible solutions for the more efficient development recommended. Consideration is given to various technical improvements that would ensure greatly improved results. Cane sugar production is considered an appropriate production for tropical and semi-tropical Third World countries. Some of the main socio-economic data of the Mauritius sugar industry are given to serve as guidelines.

PB-298 869/9 PC A06/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales Bogota.

Ciencia Tecnologia y Desarrollo, Volume 2, Numero 3, Julio/Septiembre 1978 (Science Technology and Development, Volume 2, Number 3, July/September 1978)
Miguel A. Infante D, and German Puentes G. Sep 78, 120p
Text in Spanish. Also pub. as ISSN-0120-1573.

Keywords: *Science policy, *Industrial development, Technology innovation, *Technology transfer, Colombia, Information systems, Cooperation, Coordination, Technological intelligence, Economic development, Employment, Information centers, Culture(Social sciences), Professional personnel, Government policies, Universities, Industries, Economic conditions, Immigrants, Developing country application.

The report contains six articles which focus on a methodology for technological development in Colombia, dependent upon a local capacity to meet its objectives. Cooperation and coordination between Government, University and Industry are shown as central to the problem. Acculturation suffered by local communities with the penetration of western scientific knowledge is described in a historical sketch. The loss of professionals and intellectuals through emigration is discussed, and methods of encouraging repatriation are considered. An intermediate stage of technological development is suggested as a solution to the problems of displacement of workers by modern industrial processes. Development of a national information system, to include a network of libraries and national archives, is presented in a descriptive synthesis of objectives, policies and structure to make resources of information available to the nation.

PB-298 884/8 PC A06/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Ciencia Tecnologia y Desarrollo, Volume 2, Numero 2, Abril/Junio, 1978 (Science Technology and Development, Volume 2, Number 2, April/June, 1978)
Miguel Infante D, and German Puentes G. Jun 78, 118p
Text in Spanish. Sponsored in part by Ministerio de Trabajo y Seguridad Social, Bogota (Colombia). Div. de Productividad y Technologia. Also pub. as ISSN-0120-1573.

Keywords: *Science policy, *Industrial development, Research management, Technology innovation, Economic development, Information systems, Technological intelligence, Economic intelligence, Culture(Social sciences), *Technology transfer, Resource allocation, Employment, Production, Fixed investment, Colombia, Developing countries, *Research and development, Scientific research, Developing country application, Research problems.

The report contains six articles which deal with problems in research and the development of a technological policy in underdeveloped countries, with specific reference to the Andean Group. More effective use of resources, creation of more employment, and internal production of capital goods are recommended as means of reducing technological dependence. Methods of implementing systems of scientific, technological, economic and cultural information are considered. A survey among professors and researchers at thirty Colombian Universities focuses on obstacles which research activities have encountered. Statistical data are presented as a point of departure for a study of the nature and problems of the Colombian University System.

PB-299 217/0 PC A08/MF A01
Tire Retreading Inst., Washington, DC.
Tire Retread Processing Manual
Revised edition.
1977, 154p
Sponsored in part by National Tire Dealers and Retreaders Association, Inc., Washington, DC.

Keywords: Automobile tires Reconditioning, Renovating, Failure, Standards, Maintenance, Quality control, Inspection, Plant layout, Manuals, *Automobiles, *Tires, Developing country application, Tire retreads.

This manual is a guide for tire retread and repair shops. It describes the methods to use to produce a safe and serviceable product and calls attention to those conditions and procedures which may be the cause of retread failures. It is designed to help in the training of new or inexperienced employees and as a reference if needed in a well-established shop. The manual is divided into five sections: retreading; standards; repairing; equipment installation and maintenance; and production of quality control record keeping. A glossary, charts, and illustrations provide additional information and instruction.

PB-299 225/3 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on 20-30 November 1978. Food Storage and Processing in Thailand
Background paper.
12 Oct 78, 25p
Report of Working Group No. 6, Appropriate Technology for Food Storage and Processing.

Keywords: *Food processing, *Food storage, Farm crops, Fishes, Meat, *Fruits, Canning, Technology, Developing countries, *Thailand, Developing country application, Food industry.

Agricultural crops, fish and meat which provide the basic materials for food processing in Thailand are discussed. Special emphasis is given to the fruit canning industry which is dominated by the production of pineapples. The canning process for pineapples is presented with a commentary for future technological development of the canning industry in Thailand.

PB-299 279/0 PC A04/MF A01
American Association for the Advancement of Science, Washington, DC.
Women and Development, Recommendations Resulting from a Workshop, Held at Washington, DC. on March 26-27, 1979
Irene Tinker. 27 Mar 79, 60p Rept no. AAAS/PUB-79-R-5
Contract DOS-1019-966031

Keywords: *Women, Females, Citizen participation, Developing countries, Education, Specialized training, Discrimination, Employment, Meetings, Households, Development, Developing country application.

The dominant theme of the workshop was the critical need to consider the issue of women and development as an integral part of all recommendations and projects resulting from UNCSTD. Participants felt strongly that women should have equal access to and participate in development projects at every stage, including identification, formulation, appraisal, planning, design, implementation, and evaluation. Participants made 21 recommendations which were grouped into two categories: integrated planning and the inclusion of women in the making of technology policy. Within these categories, individual recommendations were directed to international bodies, to national governments, and professional organizations. A number of recommendations centered around the need to improve available household energy sources in both rural and urban areas. The participants suggested that one of the international pilot projects sponsored by UNCSTD focus on present and changing uses and supplies of household energy. Several members of the workshop group designed such a project, specifying its purposes, types of technologies to be considered, the formulation of approach, and the execution and evaluation of the project.

PB-299 280/8 PC A09/MF A01
American Association for the Advancement of Science, Washington, DC.
Women and Development, Final Report of a Workshop, Held at Washington, DC. on March 26-27, 1979
Irene Tinker. 27 Mar 79, 185p Rept no. AAAS/PUB-79/R/4
Contract DOS-1019-966031

Keywords: *Women, Females, Citizen participation, Meetings, Developing countries, Education, Specialized training, Discrimination, Employment, Households, Development, Developing country application.

The dominant theme of the workshop was the critical need to consider the issue of 'women and development' as an integral part of all recommendations and projects resulting from UNCSTD. Participants felt strongly that women should have equal access to and participate in development projects at every stage, including identification, formulation, appraisal, planning, design, implementation, and evaluation. This volume includes, as Appendices, the papers prepared for the Workshop.

PB-299 309/5 PC A09/MF A01
American Association for the Advancement of Science, Washington, DC.
Building National Institutions for Science and Technology in Developing Countries, Proceedings of Workshop, Held at Washington, DC. on April 18-19, 1979
Charles V. Kidd. 19 Apr 79, 180p Rept no. AAAS/PUB-79/R-9
Contract DOS-1019-966031
Summary Report as PB-299 308.

Keywords: *Information services, *Technology transfer, Developing countries, Meetings, Cooperation, Organizations, User needs, Communicating, Information systems, Manpower utilization, Scientists, Engineers, Personnel development, Recommendations, Developing country application.

The 24 participants stressed the need to strengthen and improve present institutions rather than create new ones. The group also reached a consensus on three specific proposals for the U.S.: establish a new journal of scientific and technological information for developing countries, enhance the effectiveness of existing science and technology communications networks, and appoint regional science attaches. This volume includes, as Appendices, the papers prepared for the Workshop.

PB-299 328/5 PC A04/MF A01
American Association for the Advancement of Science, Washington, DC.
The Role of Scientific and Engineering Societies in Development, Summary Report of Workshop, Held at Washington, DC. on May 21-22, 1979
Jeannette Wedel. 22 May 79, 63p Rept no. AAAS/PUB-79/R-10
Contract DOS-1019-966031

Keywords: *Scientific societies, Developing countries, Meetings, Information services, Scientists, Engineers, Professional personnel, Consulting services, Developing country application.

The dominant theme of the workshop was that scientific and technical societies have certain basic characteristics which enable them to make unique contributions to the development process in any country. These societies constitute a reservoir of individual scientists, engineers, and technicians with special knowledge and expertise that can be mobilized to undertake specific tasks. They provide a peer review capability for evaluating the importance and value of scientific and engineering proposals, programs, and accomplishments; an open market for technology planning and delivery, not constrained by institutional, proprietary, or political barriers; and a useful teaching and educational function through the journals, reviews, handbooks, and books they publish on accomplishments and advances in their disciplines.

PB-299 329/3 PC A10/MF A01
American Association for the Advancement of Science, Washington, DC.
The Role of Scientific and Engineering Societies in Development, Proceedings of Workshop Held at Washington, DC. on May 21-22, 1979
Jeannette Wedel. 22 May 79, 207p Rept no. AAAS/PUB-79/R-11
Contract DOS-1019-966031
Summary Report as PB-299 328.

Keywords: *Scientific societies, Developing countries, Meetings, *Information services, Scientists, Engineers, Professional personnel, Consulting services, Developing country application.

The dominant theme of the workshop was that scientific and technical societies have certain basic characteristics which enable them to make unique contributions to the development process in any country. Participants stressed that management and transfer of scientific and technological information to developing countries is essential in the development process. U.S. societies can assist developing countries in informa-

tion exchange by: publishing the results of the research and teaching experiences of their membership; conducting meetings at which the results of recent studies and new ideas are exchanged; and sponsoring workshops or short courses. It was recommended that U.S. societies assist in the formation and growth of indigenous societies, develop relationships with US universities to provide more relevant training for foreign graduate students, and give prestige to participation in international development work. This volume includes, as Appendices, the papers prepared for the Workshop.

PB-299 352/5 PC A13/MF A01
United Nations Environment Programme, Nairobi (Kenya).
Institutions and Individuals Active in Environmentally-Sound and Appropriate Technologies (Preliminary Edition)
May 78, 283p
Prepared in cooperation with Task Force on Environmentally-Sound and Appropriate Technologies.

Keywords: *Technology transfer, *Environmental management, Directories, Environments, Developing countries, Organizations, Developing country application, Appropriate technology.

The International Referral System for sources of environmental information (IRS) is a component of UNEP's Earthwatch programme, which has been established to facilitate the exchange of environmental information within and among nations. The IRS is a referral system, that is, it does not handle the information per se, but connects those who need environmental information with those who have it. The IRS and the Task Force on Environmentally-Sound and Appropriate Technologies have undertaken a joint effort to identify and assemble potential sources of information on this subject. This Directory is the outcome. Although it was originally compiled to help IRS national focal points identify institutions and individuals which could qualify as IRS sources, it was felt that the Directory contains material which may be of wider interest. Being a preliminary listing of potential sources for IRS, it does not duplicate those institutions already listed in the IRS International Directory; nor does it claim to present a complete coverage of all organizations engaged in Appropriate Technology work.

PB-299 367/3 PC A10/MF A01
Corporacion Financiera Popular, Bogota (Colombia).
Areas Funcionales de la Empresa y Su Interrelacion(Functional Areas of the Industry and Their Interrelationships)
Oct 77, 203p
Text in Spanish.

Keywords: *Management techniques, Industrial plants, Management, Industries, Marketing, Product development, Prices, Production planning, Machinery, Management, Developing countries, Developing country application, *Small businesses.

A source of ideas is given to help small industrial entrepreneurs in the delegation of responsibilities from the administration, in defining clear objectives, and the relation among the different areas of finance and budget control. The area of market is discussed such as the product, price, and distribution. The production area presented include the planning of the production, inventories, machinery, the plant and its distribution, working conditions, supervisors, and strategies. Charts, tables, and diagrams provide further explanations.

PB-299 382/2 PC A21/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Proyectos de Investigacion en Progreso en Ciencias de la Salud, 1974-1975 (Research Projects in Health Care Science, 1974-1975)
1976, 480p
Text in Spanish. Prepared in cooperation with Asociacion Colombiana de Facultados de Medicina, Bogota.

Keywords: *Health care delivery, *Colombia, Research projects, Plans, Objectives, Health services research, Developing country application.

The volume presents information on the contents and objectives of the research plans that are being accomplished in the nation of Colombia.

PB-299 609/8 PC A05/MF A01
Environmental Protection Agency, Cincinnati, OH. Office of Technology Transfer.
Alternatives for Small Wastewater Treatment Systems. 1. On-Site Disposal/Septage Treatment and Disposal
Technology transfer rept.
Oct 77, 97p Rept no. EPA/625/4-77/011-VOL-1
Also available in set of 3 reports, PB-299 608-SET.

Keywords: *Sewage disposal, *Sewage treatment, Sites, Waste water, Sewers, Pressure, Sanitary sewers, Cost effectiveness, Vacuum, Communities, Soil properties, Percolation, Land use, Aerobic properties, Digestion(Decomposition), Pressure sewers, Small communities, Vacuum sewers, Alternative planning, Land application.

The report discusses on-site disposal systems for small wastewater flows.

PB-299 897/9 MF A01
Transportation Research Board, Washington, DC.
Low-Volume Roads: Second International Conference
Ray Millard, G. A. Edmonds, I. J. Barwell, J. D. G. F. Howe, and Janet A. Koch. 1979, 352p* Rept nos. TRB/TRR-702, ISBN-0-309-02843-4
Library of Congress catalog card no. 79-17216. Proceedings of a conference conducted by the Transportation Research Board, August 20-23, 1979.
Microfiche copies only. Paper copy available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Keywords: *Traffic engineering, *Road transportation, Highway planning, Meetings, Design criteria, Vehicular traffic, Traffic safety, Financing, Maintenance, Rural areas, Pavements, Flexible pavements, Portland cements, Highway bridges, Gravel, Developing countries, *Roads, Highway transportation, Low volume roads.

The conference discusses how to design and operate low-volume roads under constraints such as limited funding, labor-intensive construction and maintenance, inflation, design criteria that may not be appropriate to low-volume roads, stage construction, complex intragovernmental requirements, inappropriate safety requirements, wide-ranging traffic volumes and vehicle loads, environmental considerations (air and water quality, erosion, and landslides), and providing maximum socioeconomic services in route selection. The Second International Conference on Low-Volume Roads was organized to facilitate the exchange of information on the practical application of engineering principles and current practice in the design, construction, and operation of low-volume roads. The papers in this Record were presented at this conference, which was held at the Scheman Center, Iowa State University, August 20-23, 1979; several informal presentations were also made. Although not all of the above constraints were addressed by the formal papers, informal presentations and panel and other discussions generally covered the entire range of problems.

PB-299 917/5 PC A02/MF A01
Philippines Univ., Diliman, Quezon City. Science Education Center.
Technology in Education: Integrating Theory and Practice, San Salvador Case Study, Philippines
Pilar Da Silva. Feb 79, 15p
Presented at the International Seminar on Appropriate Technology in Education (1st), Bogota, Columbia, January 29-February 2, 1979. Sponsored in part by United Nations Educational, Scientific and Cultural Organization, Paris (France).

Keywords: *Education, *Philippines, Developing countries, Students, Rural areas, Mobility, Technology transfer, Community relations, Developing country application.

The paper attempts to show the approach in rural education in San Salvador. Its results show that learning related to the goal of improving the quality of life in the community generates changes and equips the community with the desire and initiative to pursue the goals themselves. The school through its principal and teachers, the government through the barangay council and other agencies, and other members of the community, work together in a spirit of cooperation towards the translation of this goal.

PB-300 357/1 PC A09/MF A01
Systems Control, Inc., Palo Alto, CA.
Marketability of Low-Head Hydropower
Final rept. Jun 78-May 79
Stephen T. Lee, G. Paul Grimsrud, and Man-Loong Chan. 29 May 79, 192p*
Contract DI-8-07-83-V-706
Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Hydroelectric power, Market surveys, *Marketing, Feasibility, Cost analysis, Economic analysis, Low head hydroelectric power plants, Sensitivity analysis, Computer applications, PUPS computer program.

The report addresses the marketability of small low-head hydropower, with head less than 20 meters and electrical generating capacity less than 15 MW. Phase I is an overview assessment for the contiguous U.S., divided into 12 regions defined by the National Electric Reliability Council, from which four geographically dispersed regions are selected for the Phase II analysis. In Phase II, representative small hydro sites are evaluated in detail with the use of a computer program called PUPS (Planning of Uncoventional Power Supply) which develops generation expansion plans for the market area for the cases with and without small hydro. By comparing these cases, the benefits or market value of small hydro are determined. Supplemental analyses estimating spinning reserve and transmission and distribution credits are reported, as well as sensitivity analyses of fuel cost escalation and interest rate.

PB-300 662/4 MF A01
American Society of Civil Engineers, New York.
Environmental Impacts of International Civil Engineering Projects and Practices
Charles G. Gunnerson, and John M. Kalbermatten. c1978, 264p
Proceedings of the American Society of Civil Engineers (ASCE) National Convention Held at San Francisco, CA. on October 17-21, 1977.
Paper copy available from American Society of Civil Engineers, 345 East 47th Street, New York, NY 10017.

Keywords: *Health, *Buildings, Civil engineering, *Environmental impacts, Citizen participation, Economic factors, Public health, Technology, Transportation, Irrigation, *Water supply, *Waste disposal, Developing countries, Social effect, Developing country application, Case studies, Environment management.

The document reports on a workshop which was convened to identify factors leading to program successes and failures in international civil engineering. Emphasized are public participation, economic measures, public health, environmentalism, and appropriate technology. The workshop was organized around two sessions. The first session was devoted generally to case studies presented by practicing engineers. The case studies included transportation, impoundment, irrigation, water supply, and waste disposal. The second session concentrated on discussions of socioeconomic and environmental considerations and their impact on civil engineering.

PB-301 075/8 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Rural Road Appraisal Methods for Developing Countries
D. I. N. Bovill. c1978, 27p Rept no. TRRL-SUPPLEMENTARY-395
Also pub. as ISSN-0305-1315.

Keywords: *Roads, Rural areas, Developing countries, Evaluations, Objectives, Highway planning, State of the art.

This report is concerned with appraisal methods for roads in rural areas of developing countries where existing traffic levels are very low and where benefits to investments in the area will be mainly related to increases in agricultural production and improvements in social welfare. Commonly used appraisal methods are critically reviewed and improved techniques incorporting social and economic objectives are proposed. (Copyright (c) Crown Copyright 1978.)

PB-301 131/9 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Bus Services in Small Towns
P. H. Martin. c1978, 22p Rept no. TRRL-LR-848
Also pub. as ISSN-0305-1293.

Keywords: Urban transportation, *Buses(Vehicles), Services, Routes, Evaluation, Economic factors, Great Britain, *Transportation, Foreign technology, Small cities.

A study is made of fixed route bus services operating in towns with populations in the range 5,000 to 30,000. Analysis of eight such services is carried out to identify and, where possible, quantify those factors which favor their operation. The study was undertaken to assess the potential for and advisability of extending this type of operation to other small towns. Quantitative assessment of the sudy services is based on the assumed objective of maximising the number of bus passengers, subject to financial constraint. The implications of this objective are analysed and it is though to be compatible with the corporate aim of a public transport undertaking and the socialaim of a local authority, It is condluded that, although in general such services are not profitable, their provision can be well justified provided that the selection of the town and the service design take sufficient account of the factors discussed. (Copyright (c) Crown Copyright 1978.)

PB-301 136/8 PC A11/MF A01
Rubber Research Inst. of Sri Lanka, Agalawatta.
A Handbook of Rubber Culture and Processing
O. S. Peries. cSep 70, 238p

Keywords: *Rubber, Handbooks, Rubber industry, Natural rubber, Plant growth, Soil conservation, Weed control, Harvesting, Processing, Manufacturing, Industrial plants, Production methods, Machinery, Packaging, Developing country application.

There has been a long-felt need in rubber planting industry for a handy manual, which contains information on all aspects of rubber production and processing. This handbook is a first attempt by the Rubber Research Institute of Ceylon to provide this information in a concise manner. Much new information on the culture of the crop and the manufacture of the product. The table of contents of the book is as follows: Part 1. Nurseries and planting material (Seedling nurseries, Budwood nurseries, Budgrafting, Clone evaluation); Part 2. Planting of rubber (Soil conservation, Replanting procedure, Planting of budded stumps, Tapping of Hevea rubber, Yield stimulation); Part 3. Plant nutrition and cultivation practices (Plant nutrition, Ground covers, Weed control); Part 4. Diseases and pests (Diseases, Pests and disorders of Hevea Brasiliensis); Part 5. Processing, manufacturing and packing (General consideration, Latex in the field, Latex in the factory, Ribbed smoked sheet (RSS), Pale crepe, Scrap crepes, New process rubbers, Packing of rubber, Latex preservation and concentration).

PB80-100076 PC A04/MF A01
Economic Research Service, Washington, DC.
Les Facteurs de l'Essor Agricole aux Etats-Unis (How the United States Improved Its Agriculture)
Raymond P. Christensen, William E. Hendrix, and Robert D. Stevens. 1963, 61p
Text in French.

Keywords: *Agricultural economics, *United States, Production, Fertilizers, Profits, Yield, Comparison, Japan, Developing country application.

In this translation of an English publication titled 'How the United States Improved its Agriculture', are the factors that gave rise to the tremendous increase in agricultural production such as fast agricultural areas, favorable political conditions, expanding technology, and the resultant use of fertilizers, examined. Cost vs. profit considerations are also graphically illustrated. Yields per hectare of lesser developed countries are compared with those of Japan and of the United States and ways to increase the production and to stimulate the economies are briefly discussed.

PB80-100084 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Sechez vos Fruits et Legumes au Soleil (Sun Dry Your Fruits and Vegetables)
Helen Strow, and Evelyn Spindler. Jul 58, 43p
Text in French.

Keywords: *Solar drying, Food processing, *Fruits, *Vegetables, Drying, Sun, Sulfur, Cookery, Containers, Requirements, Food storage, Developing countries, Food preparation, Developing country application.

The sun drying process is explained, which fruits and vegetables can be sun dried. The importance of cleanliness and of the conditions of the air atmosphere are stressed. The different steps to sun dry fruits, with the answers as to how, why, when, are answered. Selection of fruits and manipulability is discussed, as well as the sulfitation process, with material and equipment required. Listing of different fruits and the different methods are given. Same is done for the vegetables with the addition of steam cooking. Also discussed is the reverse process, namely, how to prepare sundried fruits and vegetables for consumption. This is translated from a booklet called 'Sun Dry Your Fruits and Vegetables'.

PB80-100092 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Voir pour Croire (Seeing Is Believing)
Helen Strow, and Amy Cowing. Jan 60, 27p
Text in French.

Keywords: *Management techniques, Technical assistance, Developing countries, Agriculture, Communicating, Farms, Farm crops, Farm processing, Public relations, Specialized training, Effectiveness, Developing countries, Developing country application, *Agricultural extension services, Villages, Demonstration programs.

This translation of an English publication titled 'Seeing is Believing' elaborates this theme with the aid of illustrations. Reasons for utilizing visual aids as a way to improve agricultural production and for the introduction of new methods, are listed. How to obtain the most receptive audience and present the most convincing demonstrations, are discussed.

PB80-100100 PC A03/MF A01
Agency for International Development, Washington, DC.
Developpement Communautaire: Definitions et Principes (Community Development: An Introduction to CD for Village Workers)
Jean Ogden. Apr 62, 47p
Text in French.

Keywords: *Community development, Planning, Local government, Citizen participation, Meetings, Coordination, Instructional materials, Guidelines, Management, Organizing, Leadership, Developing countries, Developing country application, Villages.

Social and economic community development through education, new product development, and use of local resources is discussed in this translation of an English publication titled 'Community Development'. The importance of raising the standard of living and improving sanitary conditions, thereby influencing the development of the nation, are stressed. Two methods for implementing these changes are outlined: (1) The direct method, where the aid of a specialist is enlisted, a study is done, solutions are suggested. (2) The indirect method, where the agent works with the local population to define problems and to present solutions. Both methods are analyzed as to desirability. Necessary characteristics for agents for community development as well as for leaders in the community are outlined. Ways of judging the success or failure rate of the effort and of long term results are included. Four references are listed.

PB80-100118 PC A05/MF A01
Small Business Administration, Washington, DC. Office of Management and Research Assistance.
Creer et Gerer une Petite Entreprise Commerciale (Starting and Managing a Small Business of Your Own)
Wendell O. Metcalf. 1962, 87p
Text in French

Keywords: *Management planning, Businesses, Management, Planning, Financing, Purchasing, Prices, Management methods, Personnel management, Insurance, Records management, Regulations, Laws(Jurisprudence), Taxes, *Small businesses, Franchising, Developing country application.

In this translation of an English publication titled 'Starting and Managing a Small Business of Your Own', are the factors, that influence to a large extent the success or failure of a small business, considered. Personality traits, type of enterprise, financing, sole-ownership vs. joint-proprietorship, location, price determination, salesmanship, personnel, laws, patents as well as the expected success rate, are analyzed with the aid of graphs and tables. A questionnaire, giving the most important points to consider, as well as a chart showing what avenues to explore to remain up to date, are included.

PB80-100126 PC A04/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise - La Gestion du Personnel (Personnel Management Guide for Small Business)
Ernest L. Loen. Feb 61, 64 Rept no. SMALL BUSINESS MANAGEMENT SER-26
Text in French.

Keywords: *Management techniques, Personnel management, Selection, Employment, Recruiting, Personnel development, Salary administration, Benefit plans, Labor relations, Developing countries, Guidelines, *Small businesses, Developing country application.

The importance and difficulties of obtaining good personnel for a small business, are discussed in this translation of an English publication titled 'Personnel Management Guide for Small Business'. Various brochures, relative to the subject matter unoer discussion, are listed in the text. The following topics are discussed: Hiring of personnel: Ways of recruiting, selecting, testing, obtaining references from and interviewing personnel. Standard employment forms are included. Training of personnel--Setting up a training program, promotion training, group training, training of specialists; Renumeration--Salaries, gratuities, pension plans, vacation, sick leave, paid holidays and insurance are discussed; Work milieu and Social services--included are social services, recreation and financial aid; Relations with personnel--Discusses factors other than salary, necessary to retain personnel--job safety, advancement possibilities, open communication and complaint possibility; and Relations with unions--Collective bargaining, union contracts.

PB80-100134 PC A04/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise - L'Implantation d'une Usine (Profitable Small Plant Layout)
John R. Immer. Jan 58, 63p
Text in French.

Keywords: *Management techniques, *Plant layout, Industrial plants, Plant location, Production engineering, Prices, Production methods, Production planning, Workplace layout, Developing countries, Developing country application.

Remaining competitive through expansion of production, adaptation of new methods, enlarging of sites, price reduction, review of production methods, and assembly-line production, are discussed in this translation of an English publication titled 'Profitable Small Plant Layout'. Hiring of specialists and which specialists to consider vs. working with present staff to implement changes, cost as a function of time, and planning for the future taking into consideration floor space, obsolescence, expansion of product line to maximize capabilities, as well as layout of necessary rooms for office-, factory-, storage- and shipping space, are detailed. Time saving through effective planning of production and handling are graphically displayed. Time studies and layout of work areas are analyzed. A bibliography is included.

PB80-100142 PC A03/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise - Les Manutentions (Improving Materials Handling in Small Plants)
Wilford L. White. Feb 53, 50p Rept no. SMALL BUSINESS MANAGEMENT SER-4
Text in French.

Keywords: *Management techniques, *Materials handling, Industrial plants, Cost engineering, Automation, Safety, Yield, Equipment, Maintenance, Machinery, Developing countries, *Small businesses, Developing country application.

In this translation of an English publication titled 'Improving Materials Handling in Small Plants' is a definition of materials handling given, and its cost as a factor in the cost of the production, distribution and sale of the product discussed. Suggestions for cost reduction through automation, flow charts of reduction in handling time, while considering safety and yield, and choice of equipment are included. A questionnaire to make small business owners aware of different possibilities, is included. Maintenance and optimum utilization of machinery are discussed. A short bibliography, listing organizations and publications, is included.

PB80-100159 PC A05/MF A01
National Planning Association, Washington, DC.
Developpement Economique (Selection I) (Economic Development, Section IV)
Frances M. Geiger. Jul 61, 94p
Text in French.

Keywords: *Industrial development, Economic development, Foreign aid, United States, Technology, Machinery, Political science, Industries, International relations, Latin America, Asia, Far East, Developing countries, Developing country application.

This translation of an English publication titled (Economic Development, Section IV) covers the following: A new concept of American assistance to foreign countries during the years 1960 to 1970 with excerpts from speeches made by the President of the United States; Science and technology, and how they can benefit developing countries with studies of some recent realizations; Human investments; Utilization of used machinery in the developing countries; Some examples of the choice of technology in manpower programs; Relative advantage and policies of expansion; Small industry in the economic development; Banks of industrial development in tropical Africa; International partnerships; Proposed reforms for the world monetary system; Two meetings on the economic development in Latin America 1960 and Asia and the Far East 1960.

PB80-100167 PC A02/MF A01
Economic Research Service, Washington, DC.
Sources et Causes de l'Accroissement de la Production Agricole aux Etats-Unis: Suggestions pour l'Agriculture aux Indes (Sources and Causes of Increased Farm Production in the United States: Implications for Indian Agriculture)
Glen T. Barton, and H. L. Stewart. Aug 58, 24p
Text in French.

Keywords: Agricultural engineering, Agricultural products, Farm crops, Productivity, Comparison, *India, *United States, Developing countries, *Agriculture, Developing country application.

In this translation of an English publication titled 'Sources and Causes of Increased Farm Production in the United States' are the factors considered that have led to the enormous increase in agricultural production in the United States, with emphasis on the period during and following the Second World War. Although many of these factors have a parallel in India, a similar large increase in production did not take place. The analysis lists as a major cause of the disparity, the difference in attitudes between the farmers, the American being considered mainly with profit, the Indian sacrificing his standard of living increase, to provide his daughters with a dowry. Hope is expressed that, since many factors are similar between the two countries, an increase in production will be obtained from learning from the United State's experience.

PB80-100290 PC A05/MF A01
Small Business Administration, Washington, DC.
Petite Entreprize - Le Lancement des Produits (New Product Inroduction for Small Business Owners)
Peter Hilton. 1961, 99p
Text in French.

Keywords: *Management planning, Industries, *Product development, Sales, Prices, Publicity, Demand(Economics), Competition, Developing countries, *Small businesses, Developing country application.

Why and how to introduce a new product, and what product to consider, is outlined in this translation of an English publication titled 'New Product Introduction for Small Business Owners'. Competition with large institutions through regional sales, price cutting, imaginative presentation, and obtaining the goodwill of customers, are discussed. Market research, market share, pricing policy, export possibilities, legal restrictions, the use of specialists such as engineering consultants, advertising agencies, and industrial research bureaus are examined. Other factors discussed include warranty, maintenance, saturation point, and ways of measuring success over a period of time. Necessary requirements for a new product launch such as demand, distribution, effect on competition, and timing are also discussed. Some failures of new product launching are analyzed and a table listing results from 200 major firms is included. References to government and private publications are given.

PB80-100308 PC A02/MF A01
Agency for International Development, Washington, DC.
Irrigation par Aspersion (Sprinkler Irrigation)
Lester A. Robb. Nov 66, 18p
Text in French.

Keywords: *Irrigation, Sprinkler Irrigation, Manuals, Operations, Pipelines, Sprinklers, Design, Cost analysis, Selection, Developing country application.

In this translation of an English publication titled 'Sprinkler Irrigation' are the factors, to be considered before placing of an irrigation system, such as type of culture, terrain, cost and climate outlined, and the possible ways of irrigation given. Types of sprinkler systems and calculations of water output at various pressures are included. A schematic of a sprinkler system, and a short bibliography are included.

PB80-100316 PC A10/MF A01
Bureau of Labor Statistics, Washington, DC.
Comment Faire une Enquete sur la Main-D'Oeuvre (Conducting a Labor Force)
Sep 64, 209p
Text in French.

Keywords: *Management techniques, Personnel management, Surveys, Manpower, Statistical data, Collecting methods, Employment, Sampling, Questionnaires, Recruiting, Training, Data acquisition, Developing countries, Developing country application, Labor force.

The report explains how to organize a survey of manpower resources in developing countries. It includes recruiting and training of persons to conduct such surveys.

PB80-100332 PC A03/MF A01
National Project in Agricultural Communications, East Lansing, MI.
Les Campagnes de Vulgarisation Agricole (Campaigns in Agricultural Extensions Programs)
John W. Spaven. 1960, 29p
Text in French.

Keywords: Specialized training, Education, Instructional materials, Promoting, Agricultural products, Production, Budgeting, Farm management, Scheduling, Objectives, *Agricultural extension services, Rural extension, Developing country application.

The report contains reasons for and ways of launching a campaign to increase agricultural production presented with the aid of illustrations. Five major steps are outlined: Creating a committee, defining the objectives, setting up a calendar, establishing a budget, and documentation of the plan. Preparation of a task force to carry out this plan, obtaining of the necessary materials, and ways of implementing the program are considered.

PB80-100340 PC A03/MF A01
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Comment Etablir une Association d'Epargne et de Credit (Establishing Savings and Loan Associations in Less Industrialized Countries)
Roy J. Burroughs. Mar 67, 35p
Text in French.

Keywords: Banks(Buildings), Developing countries, *Banking, Savings, Capital, Investments, Operating costs, Interest, Law(Jurisprudence), Budgeting, Financial management, Finance, Savings and loan associations, Financial services, Loans, Mortgages, Developing country application.

Savings and Loan Associations as a source of money for financing home loans are considered. Questions relative to bankruptcy, interest, default, size of loan, and legal considerations are posed. Other factors to be considered before starting a successful Savings and Loan Association such as number of inhabitants, economic activity, the construction scene, fiscal considerations, public financing, average amount of savings are discussed. Interest margin, the importance of and the area of influence of a Savings and Loan Association, personnel, budget- and liquidity considerations, are also discussed. A bibliography and a sample calculation of revenue and expenses, including an explanation of terms, are given.

PB80-100357 PC A07/MF A01
Department of Agriculture Extension Service, Washington, DC.
Travaux Menagers en Milieu Rural (Homemaking Around the World)
Nov 73, 148p
Text in French.

Keywords: Food preparation, Nutrition, Health, Sanitation, Houses, *Clothing, Food preparation, Pest control, Cookery, Hygiene, *Children, Developing countries, Vegetables, Agronomy, *Home economics, Child care, Developing country application.

In this translation of the English publication titled 'Home Making Around the World', the following topics are covered: Baby care and needs. Everything from psychological needs, love, safety, discipline etc., to physical needs, diet rest, playtime, clothing; Food and diet. Plans to train assistants for teaching mothers, food values, available vegetables, and their cooking, canning, drying, and juice-making; How to run the home. Different ways of heating foods are considered, different kinds of ovens are shown, cooking utensils, washing instructions and pest control are elaborated; Hygiene, of home, and personal. All aspects of sanitation in the home are covered, as well as cleanliness of hair and body; Vegetable gardens. How to choose the proper area for growing vegetables and kinds to grow. Importance of fertilizers is treated and pest control; How to raise poultry, rabbits and goats, what to feed them and how to keep them healthy. How to improve the rural home. This section covers native habits, how to whitewash walls, beds and bedding; and How to sew and take care of clothing, including the preparation of patterns and mending.

PB80-100365 PC A04/MF A01
Agency for International Development, Washington, DC.
Batir Soi-Meme - Formation des Animateurs de l'Operation 'Castor' (Leader Training for Aided Self-Help Housing)
Keith H. Hinchcliff. May 63, 71p
Text in French.

Keywords: *Housing, Project management, Instructional materials, Technical assistance, Construction materials, Personnel, Visual aids, Developing countries, Developing country application, Self help housing.

This translation of an English publication titled 'Leader Training for Self-Help Housing' covers the following points: Types of assistance required--technical, financial, material and specialists; Advantages and drawbacks of a self-help program--reduced lay-out, satisfaction, creation of small businesses, time and quality considerations; Examples of programs of self-help without outside assistance. Need for visual aids and technical advicre when no actual assistance is given; How to plan a program for a collective construction project. Layout, security and comfort are considered; Various construction materials are discussed; An evaluation of resources, personnel, financing, equipment and necessary assistance. Charts are included; A discussion on how to educate and to animate the people. Discusses visual-aids; and Methods to be used to

assure favorable results, when launching a local construction program, and assistance is given.

PB80-100373 PC A05/MF A01
Ghana Academy of Sciences, Accra.
Le Jardin Potager en Pays Chaud (Better Vegetables)
Daniel A. Sekyere, and Sandy J. McCorvey. Jul 67, 100p
Text in French.

Keywords: *Vegetables, Tropical regions, Vegetable plants, Ghana, Developing countries, Cultivation, Hand tools, Soil properties, Planting, Mulches, Plant growth, Plant diseases, Pest control, Manuals, *Africa, Developing country application.

The report describes the different ways of growing vegetables in warm countries. The choice of tools is described with drawings. The location of the garden must take in consideration the nature of the soil, the different levels of the land, the problem of irrigation, the closeness to the home. The preparation of the soil comes next with clearing, digging, enclosing of the plot. Different times are chosen for seeding and sowing in accordance with the regions: seaside, forests, northern or subtropical. Documents appended on hygiene for the garden, on vegetables' parasites and diseases, on sturdy varieties, culture for North African Coasts, rotation of crops, abundance of nutritious elements in the different vegetables. This is translated from a booklet called 'Better Vegetables'.

PB80-104144 PC A06/MF A01
National Research Council, Washington, DC. Commission on International Relations.
World Food and Nutrition Study
Interim rept.
Nov 75, 104p ISBN-0-309-02436-6, NSF/RA/E-75/377
Library of Congress catalog card no. 75-37120.

Keywords: *Food supply, Nutrition, Nutritional deficiency diseases, Population growth, Farm crops, Research, Breeding, Agricultural engineering, Water supply, Developing countries, Soil classification, Protein, Resources, World food.

Critical dimensions of the world food and nutrition problem are addressed including malnutrition and population growth. Research areas are concerned with conventional breeding for higher yields on a dozen or fewer crops that produce most of the world's calories and protein, on-farm management of water in developing countries, large scale soil classification, and collection and evaluation of worldwide germ plasm. The focus is on how the U.S. can best contribute to building the research base to avert mass hunger for future decades. High priority in the field of nutrition should be given to the development of low cost technologies for fortifying mass-consumed foods of developing countries, for the improvement of nutritional programs in developing countries, and for better identification of the extent, nature, and effect of protein deficiencies. Also included in this report is a paper on recommended actions on nutrition research and development.

PB80-105885 PC A05/MF A01
Office of Technology Assessment, Washington, DC.
Gasohol: A Technical Memorandum
Sep 79, 89p* Rept no. OTA/TM/E-1

Keywords: *Bioconversion, *Alcohols, *Waste recycling, *Agricultural wastes, Biomass, *Fuels, Ethanols, Gasoline, Blends, Benefit cost analysis, Technology, Economic analysis, Environmental impacts, Regulations, Synthetic fuels, Solid wastes, *Gasohol, Social impacts.

The Office of Technology Assessment is currently preparing an assessment of energy from biological processes. An extensive analysis of alcohol fuels from agricultural products was performed. This technical memorandum presents these findings in response to congressional interest in synthetic fuels. The purpose of the memorandum is to illuminate the technical and non-technical issues surrounding the development of gasohol. It discusses the resource base, production technologies, and economics of gasohol, and its use as a transportation fuel. The report also contains a discussion of the environmental problems and benefits of producing and using gasohol, and the social and institutional issues about using agricultural products for energy. The final report on energy from biological processes is scheduled for delivery to Congress in January 1980 and will contain an analysis of policy options about gasohol as well as other bioenergy technologies such as wood and methanol production.

PB80-106768 PC A05/MF A01
Agricultural Research Service, Washington, DC.
Poulaillers et Installations de Ponte (Housing and Equipment for Laying Hens)
Hajime Ota. 1965, 77
Text in French.

Keywords: *Animal husbandry, Chickens, Eggs, Livestock equipment, Cooling, Heating, Ventilation, Drawings, *Poultry, Developing country application.

The publication discusses the factors that should be considered for a successful production of chickens. Number of animals, influence of climate on egg-laying, cooling, heating, ventilation, insulation, and construction are discussed. Drawings elaborate the important construction points of chicken coops. This publication is a translation of an English publication titled: 'Housing and Equipment for Laying Hens'.

PB80-106776 PC A05/MF A01
Agency for International Development, Washington, DC.
L'Entretien des Animaux de la Ferme (Raising Livestock)
1962, 79p
Text in French.

Keywords: *Poultry, *Animal husbandry, Livestock, Chickens, Turkeys, Ducks, Geese, Swine, Sheep, Rabbits, Goats, Livestock equipment, Beef, Feeding stuffs, *Milk, Eggs, Developing country application.

This translation of several English publications published by the Animal Husbandry Research Division, U.S. Department of Agriculture, covers the following:- The upkeep of a flock of egg-laying hens. What is needed to start. The size of the flock. The housing, the equipment necessary. How to care for them. -The upkeep of a dairy goat. How to choose the animal. Pasture and food. The cost of building a barn or to fence an area suitable. The breeding. Hygiene. -The keeping of a cow. How to choose the animal. How to care for it. Winter and summer feeding with costs. The barn. Breeding and calving. How to care for the calf. How to milk a cow and treat the milk. How to make butter. -Methods for raising beef. The upkeep of chickens, turkeys, ducks, geese, pigeons, sheep, rabbits, pigs is also included in this booklet.

PB80-106792 PC A05/MF A01
Department of Agriculture, Washington, DC.
Comment Creer une Cooperative (How to Start a Cooperative)
Irwin W. Rust. 1963, 95p
Text in French.

Keywords: *Agricultural cooperatives, Planning, Organizing, Management, Regulations, Cooperatives, Developing country application.

This translation of two English publications, one titled 'How to Start a Cooperative', the other 'Sample Legal Documents for New Cooperative' covers the following: (1) What is a cooperative. When to use a cooperative. Number of members and how to evaluate the expected turnover; (2) The preparation by an investigative committee. Evaluation of capital, expenses, stocks, syndication, loans; (3) How to organize the first meeting with the members; (4) Work which must be accomplished by the organization committee. Recording of the rules and chart. Recording of contract, membership; (5) Organization of a second meeting; and (6) Conditions for success. Knowledge of social legislation. Need of lawyers. Election of the board of directors.

PB80-106800 PC A08/MF A01
Agricultural Research Service, Washington, DC.
L'Amelioration des Sols Salins (Improvement of Salt Marshes)
1963, 157p
Text in French.

Keywords: *Agriculture, *Soils, Saline soils, Farm crops, *Marshes, Developing countries, Rice plants, Toxic tolerances, Damage, Fertilizers, Irrigation, Boron, Grasses, Developing country application, Salt marshes.

The problems of salinity covered in this booklet are: Where does the salt come from, why; different ways to treat salt marshes; effects of salinity in agriculture; toleration to salt of grains and vegetables; toleration of crops to exchangeable sodium; damages caused to plants by boron; use of briny water for irrigation in damp areas; chemicals which can be used to improve sodic soils; how to grow rice on salted lands; salinity and irrigation.

PB80-111339 PC A99/MF A01
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
La Investigacion en la Universidad Colombiana (Research in the Colombian University)
Efrain Otero Ruiz. Feb 78, 703p
Text in Spanish.

Keywords: *Technology transfer, *Research and development, Research projects, Universities, *Colombia, Financing, Statistical data, Expenses, Objectives, Research management, Scientific research, Developing country application.

The report presents research in progress reported by the public and private universities of Colombia for 1977. Part One describes the characteristics and present status of research in the universities, including financial resources, and indicates the problems encountered in funding the projects. Part Two consists of the principal statistical information collected in the study. Part Three lists research projects by university, school, department or division. In Part Four 606 research projects are outlined by title, objective, scientific discipline, field of application, principal researcher and co-workers, cost of project, and institution, department or school conducting the project. Part Five lists researchers alphabetically within each university, including the file number of the project in progress or completed. A Glossary of Terms is included in the Addendum.

PB80-111610 PC A07/MF A01
Department of Agriculture Extension Service, Washington, DC.
Vulgarisation Agricole et Menagere: Methodes d'Enseignement (Extension Teaching for Farm and Home Making)
Meredith C. Wilson, and Gladys Gallup. May 54, 150p
Text in French.

Keywords: *Agricultural extension services, Education, Agriculture, Methodology, Farm management, Rural sociology, Rural areas, Learning, Instructional materials, Leadership, Instructors, Rural extension, Teaching methods, Rural populations, Curricula, Developing country application.

The report discusses methods of extension teaching and their efficiency and cost. It includes advice for the instructor and teaching aids.

PB80-112790 PC$40.00
Centro de Estudias Mesoamericano sobre Tecnologia Apropiada, Guatemala City.
Memorias: Simposio Internacional sobre el Terremoto de Guatemala, del 4 de Febrero de 1976 y el Proceso de Reconstruccion. Volumes 1 and 2. (Proceedings: International Symposium on the February 4th., 1976 Guatemalan Earthquake and the Reconstruction Process. Volumes 1 and 2).
15 May 78, 1699p
Text in Spanish.

Keywords: *Buildings, Earthquakes, *Guatemala, Meetings, Earth movements, Earthquake resistant structures, Damage assessment, Dynamic structural analysis, Dynamic response, Developing countries, Ground motion, Seismic design, Seismic risk, *Earthquake engineering.

In Feb. 4th, 1976 Guatemala suffered the strongest earthquake since 1917. It caused 24,000 deaths and 77,000 wounded. 1 million people were left homeless. This report of 72 papers presented by engineers, geologists, seismologists et al., has as its main objective to study the natural tectonic causes of earthquakes, in order to prevent similar disasters. Papers deal with dif-

ferent aspects of the earthquakes: history of previous quakes in Guatemala, hazards of building constructions, and application of modern theories to calculate earth pressures. Some chapters are quite readable, but some others are written for the specialized mind. Great length is given to the 100 day plan for reconstruction of Guatemala, which can be applied in similar disasters. Conclusions and recommendations for reinforcement of bridges and the problem of 'lifelines' are studied extensively, resulting in Earthquake Reduction Programs for the protection of lives, health, property and welfare.

PB80-113236 PC A03/MF A01
Department of Agriculture Extension Service, Washington, DC.
Former des Demonstratrices de l'Enseignement Menager: Description d'un Cycle d'Etudes International aux U.S.A. (How to Train Assistants for Home Making)
Sep 63, 28p
Text in French.

Keywords: *Home economics, *Training, Specialized training Households, Developing countries, Kitchens, Females, Residential buildings, Developing country application.

The report is translated from a booklet called 'Participants Learn by Doing'. The apprenticeship is on the job with classes and visits, discussions, exhibits. Samples of subjects discussed: How to provide sewers, to make a refrigerator without ice, to keep food from spoiling, to make a shower with disposable means. The main purpose is to recognize and help solve the home making problems with readily available means. Participating countries: Northern Rhodesia, Ghana, Kenya, Nigeria, Liberia, Jamaica.

PB80-113244 PC A06/MF A01
National 4-H Tractor Program's Extension Sub-Committee.
L'Entretien des Machines Agricoles (Far , Machinery Care)
1979, 124p
Text in French.

Keywords: *Agricultural machinery, Maintenance, Components, Screws, Nuts(Fasteners), Bolts, Nails(Fasteners), Wrenches, Tools, Engines, Plows, Tractors, Developing countries, Developing country application.

The translation of an English publication titled 'Machinery Care Project D Units' covers the following: Knowledge of parts used in machinery; The importance of screws and bolts, nuts, wrenches, their size, the different size of nails, their different shapes; the main point being for each task, its tool; Gearboxes are described with photos; Diagrams of engines and all mechanical aspects of machinery are shown. Different farm machinery treated in the brochure are tractors, ploughs, harrows, sprays, cultivators, planters, mowers, choppers, harvesters, threshing machines, cotton gins, cotton pickers, and corn shellers. The different systems of coupling machinery are described. Maintenance for all machinery is also included.

PB80-113251 PC A05/MF A01
Agricultural Research Service, Washington, DC. Crops Research Div.
Le Sorgho a Grains: Culture et Utilisation (Culture and Utilization of Grain Sorghum)
W. M. Ross, and O. J. Webster. 1967, 82p
Text in French.

Keywords: Grain sorghum plants, Planting, Climate, Herbicides, Irrigation, Harvesting, Storage, Production, Developing countries, *Sorghum, Developing country application.

The illustrated publication gives a detailed description of grain sorghum, climates where it is best grown, varieties and hybrids, rotation, fertilizers, planting time and methods, weed killing, irrigation, harvesting, storage, utilization, insects and diseases, and production, with special emphasis on the production of seed-grain and hybrids.

PB80-113269 PC A05/MF A01
Soil Conservation Service, Washington, DC.
Comment Irriguer vos Terres (Land Irrigation)
1963, 97p
Text in French.

Keywords: *Irrigation, Developing countries, Plant growth, Irrigation canals, Ditches, Soil properties, Pipes, Water distribution, Developing country application.

This translation of an English publication titled 'Irrigation on Western Farms' covers the following: What is irrigation; how to irrigate lands; the humidity of the soil and its importance for the growth of plants; diagrams on the different methods used for irrigation; conveyance and control of irrigation water; how to build ditches, and to lay pipes; and the different kinds of canalization with photos and diagrams.

PB80-115084 PC A08/MF A01
Minnesota Univ., Minneapolis. Div. of Environmental Health.
Manual para Pozos Pequenos (Small Well Manual)
Ulric P. Gibson, and Rexle D. Singer. Sep 69, 170p
Text in Spanish.

Keywords: *Water wells, Construction, Manuals, Design criteria, Maintenance, Aquifers, Sites, Ground water, Well logging, Cutting fluids, Drilling machines(Tools), Centrifugal pumps, Jet pumps, Rotary pumps, Diagrams, Tables(Data), Installing, Purification, Developing country application.

Information on the installation of small water systems is presented in this report. The material presented can be used by non-technical people working directly in the field, as well as by engineers and hydrologists. Information is given on how to locate, construct, and operate a small well which can provide good quality water to supply the needs of small communities by producing 50 gallons per minute. Topics include: origin, occurrence and movements of ground water, water well design, maintenance, pumping equipment and sanitary protection of ground water supplies.

PB80-116361 PC A04/MF A01
Ministerio de Agricultura y Ganaderia, Soyapango (El Salvador). Servicio de Recursos Pesqueros.
Cultivo Bisexual de 'Tilapia aurea' en Jaulas Flotantes en el Lago de Ilopango, Volume IV, Number 2 (Bisexual Cage Culture of 'Tilapia aurea' in Lake Ilopango, Volume IV, Number 2)
Technical rept.
Jose Francisco Godinez, and Ricardo Alfredo Castro Aragon. Sep 77, 62p
Text in Spanish.

Keywords: Aquaculture, Fresh water fishes, Developing countries, Feeding stuffs, Weight(Mass), Growth, Cost estimates, Feasibility, Animal nutrition, *El Salvador, *Fishes, Developing country application, Tilapia aurea.

The growth and production of Tilapia Aurea in cubic and cylindrical culture cages was studied for 91 days starting in October 1976. The stocking densities used were 250, 375, and 500 fish/cu m. The two rations of feed that were used were 3.0 and 2.5%, based on the weight of the stock fish mass. The feed formula contained 20.31% of total protein. Best results are obtained using 250 fish/cu m as the stocking density and a 3% feed ratio. This approach gave an average net production of 20.07 kg/cu m and an economic gain of $38.22/cu m. Estimates of the cost of this fish production operation and its feasibility for commercial exploitation are given in two appendices.

PB80-116379 MF A01
Centro de Desarrollo Industrial del Ecuador, Quito.
Industrializacion del Banano; Evaluacion de Alternativas Tecnologicas (Industrialization of the Banana; Evaluation of Technological Alternatives)
Flavio Calle M. Apr 79, 138p
Text in Spanish.
Microfiche copies only.

Keywords: *Fruits, *Food processing, Selection, Preserving, Sanitation, Food industry, Food packaging, Pasteurizing, Developing countries, Food storage, Nutrition, Machinery, Kitchen equipment and supplies, Production, Prices, *Ecuador, Bananas, Developing country application.

The banana and several processed products and their uses are discussed. Only products which use the fruit itself are considered, no seed or peel byproducts. For each of the derived products, there is a separate section on the technology used in the preparation. A general discussion on fruit selection and preservation and on quick and aseptic processing is included. Atmospheric controlled ripening chambers, washing and peeling processes, homogenization, pasteurization, packaging, freezing, and storage are also detailed. Each derived product, which include banana puree, b. flakes, b. powder, b. flour, b. figs, b. juice, b. vinegar, green banana chips, etc. is considered in a separate section. Chemical composition, nutritional evaluation, and step by step diagrams for each technological process are given. Tables on total banana production and on prices of bananas and derived products during the years 1973-78 in Ecuador, are included. Other tables discuss appropriate ripening conditions and need for addition of sugar for some of the derived products. Photographs and diagrams of ripening chambers, washing and peeling machines, pulp extractors, dryers, etc. are included. A color photograph of bananas in various stages of ripeness is reproduced in black and white.

PB80-116718 PC A03/MF A01
Institute of Medicine, Washington, DC.
Pharmaceutical Innovation and the Needs of Developing Countries
Final rept.
Jun 79, 30p Rept no. IOM-79/06
Contract DHEW-282-78-0163

Keywords: Developing countries, *Drugs, Meetings, Policies, Costs, Recommendations, History, National government, United States, Vaccines, Diseases, *Health care delivery, Innovations, Research and development, Health care technology, Pharmaceutical services.

Development of new pharmaceuticals by U.S. drug firms is handicapped by a 'major lack in public policy.' The government regulates drug research and development, which adds substantially to the cost and risk of the enterprise, but the government usually does not foster the development of drugs needed for particular threats to the public's health. The lack in policy is the absence of a counterbalance to the regulatory role. The policy problem is of increasing importance now that discovery and development of drugs on a ration, rather than empirical, basis is scientifically feasible. Coordinated programs under government leadership would be required to take advantage of the scientific opportunities. Recommendations are stated to remedy the policy lack.

PB80-120017 PC A07/MF A01
Office of Technology Assessment, Washington, DC.
Pest Management Strategies in Crop Protection. Volume I
Oct 79, 128p* Rept no. OTA-F-98

Keywords: *Pest control, Pesticides, Farm crops, Agricultural economics, Farm management, Assessments, Protection, Herbicides, Rodenticides, Insecticides, Weed control, Apple trees, Wheat plants, Corn plants, Cotton plants, Soybean plants, Grain sorghum plants, Trends, Losses, Predictions, Economic impacts, Developing countries, Technology transfer, Constraints, United States, *Crops, Integrated pest management, Biological pest control, Crop rotation.

The primary focus of the report is on agricultural crop protection. The study sought to: (1) assess crop protection problems, current and emerging control technologies, and projected future developments over the next 15 years for each of seven regional cropping systems in the United States; (2) evaluate Federal constraints to improved pest management in the United States, and (3) review the problems, potentials, and impacts of the transfer of North American crop protection technology to the developing world. These objectives were addressed by nine study groups: one each for the seven cropping systems in 1 and one each for 2 and 3. The crops and regions selected were: wheat in the Great Plains States, corn in the Corn Belt, cotton and sorghum in Texas, deciduous tree-fruits (especially apple) in the northern half of the country, potatoes in the Northeastern States, soybean in the Southeastern sector, and selected vegetables in California. These crops are representative of more than 90 percent of U.S. agricultural production.

PB80-121486 PC A06/MF A01
Bureau of Labor Statistics, Washington, DC. Div. of Foreign Labor Conditions.
Metodologia para el Estudio de la Fuerza de Trabajo de los Paises en Desarrollo (Conducting a Labor Force Survey in Developing Countries)
Matilda R. Sugg. Jun 64, 114p
Text in Spanish.

Keywords: Personnel management, Developing countries, Manpower, Statistical data, Labor relations, Surveys, Employment, Classification, Recruiting, Specialized training, *Management techniques, Developing country application.

The manual is intended as a training guide for the professional staff which is conducting a labor force survey in developing countries. Such a survey will provide data for which a country may: (1) assess the potential manpower which is available for economic development, its education, experience, skill, and other pertinent information; (2) evaluate the kinds of jobs which must be provided to minimize unemployment and underemployment; (3) project future manpower resources which when compared with the future manpower requirements, will help identify employment and training needs; (4) anticipate possible limitations on development caused by shortages of particular skills; and (5) determine differences in employment, unemployment, and underemployment according to the different economic, social, and ethnic groups exisiting within the population.

PB80-122203 PC A06/MF A01
Agency for International Development, Washington, DC.
El Agua y La Salud Del Hombre (Water and Man's Health)
Arthur P. Miller. Apr 62, 118p
Text in Spanish.

Keywords: *Water pollution, Disease vectors, Bacteria, Cholera, Bacillary dysentary, Diarrhea, Poliomyelitis, Tularemia, Radioactive wastes, Cyanides, Arsenic, Sulfonates, Chlorides, Chloroform, Phenols, Standards, *Diseases, Developing country application, Water pollution standards.

Much is known of the chemical and biological relationships of water to human physiology but the general place of water in the ecology of mans needs better focus. A precise knowledge of this water-man-health relationship is needed due to the fact that the worldwide development of water resources is of ever increasing importance to the social and economic development of millions of people. This book has been written to improve understanding of this relationship. The four areas discussed are: The role of water; parasites and water; the relationsip of water to other chemicals; and radioactive materials in water.

PB80-122286 PC A05/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Aquatic Weed Management: Integrated Control Techniques for the Gezira Irrigation Scheme. Report of a Workshop, Held at Wad Medani, Sudan on December 3-6, 1978
Oct 79, 97p Rept no. CIR/BOSTID-79/SUD
Contract AID/ta-C-1433

Keywords: Aquatic weeds, *Weed control, Meetings, Developing countries, Management, Irrigation canals, Recommendations, Herbicides, Removal, Fishes, Arthropoda, Losses, Culicidal, Malaria, Schistosomiasis, Nile River, *Africa, *Aquatic plant control, Foreign technology, Biological pest control, Sudan Republic(Africa).

No abstract available.

PB80-124118 PC A08/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Appropriate Technologies for Developing Countries
Final rept.
Richard S. Eckaus. Apr 77, 158p Rept no. CIR/BOSTID-79/24
Contract AID/csd-2584

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.

Keywords: Technology assessment, Developing countries, Economic development, Political science, Social effect, Economic impact, Decision making, Technological intelligence, *Technology transfer, Constraints, Sociology.

The report attempts to analyze the interrelationships between technological choices and economic, social, and political aspects of the development process. Its primary aim is to help decision makers and others become more aware of the complexities and constraints inherent in technological choice for developing countries.

PB80-125085 PC A04/MF A01
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology for Manufacture of Whiteware Pottery on Cottage Basis in Rural Areas
Project report and feasibility study series no. 3
M. K. Garg, and Rajinder Singh. 27 Jun 79, 59p
Sponsored in part by Agency for International Development, Washington, DC.

Keywords: *Pottery, Organizations, Manufacturing, Marketing, Equipment, Materials, Technology, Developing countries, Developing country application, Villages.

The publication reflects an appropriate technology for the Indian village potter through a combination of product-selection, technology and organizational pattern. With help from this publication, interested organizations in India and other developing countries can set up a whole infrastructure including service center, production unit and marketing organization so that the village potters can manufacture whiteware pottery in their own homes or in cottages in villages and earn a reasonable living thereby.

PB80-125693 PC A05/MF A01
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology on Mini-Sugar (Ops Khandsari)
Project report and feasibility study series no. 2
M. K. Garg. Mar 79, 100p

Keywords: *Industrial plants, Manufacturing, *Sugar, Machinery, Equipment, Production capacity, Sugarcane, Production methods, Sugar crops, Developing countries, Developing country application, Villages.

The publication consists of a feasibility study for the benefit of Indian entrepreneurs as well as for other developing countries who produce sugarcane as a major cash crop. This technology can be used for setting up mini-plants for manufacturing white crystal sugar. The report includes detailed descriptions of working of machinery, equipment, cost of machinery installation, expected performance, economics of working, cost-benefits, etc., for the prospective entrepreneurs to enable them to understand fully the procedures and implications of setting up a mini-sugar unit.

PB80-125701 PC A04/MF A01
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology for Cotton Yarn Spinning on Cottage Basis in Rural Areas
Project report and feasibility study series no. 1
M. K. Garg, and Robert Bruce. 2 Oct 76, 55p

Keywords: Spinning(Staple fibers), *Textile industry, *Yarns, Cotton spun yarns, Rural areas, Spinning frames, Cotton fibers, Spindles, Weaving, Machinery, Mills, Textile processes, Developing countries, Villages, Developing country application.

The report includes detailed description of working of machineries and equipment, expected performance, cost of machinery and installations, wages and income available to the workers, economies of working, etc. in the cotton yarn spinning industry. It will help developing countries set up either the pre-spinning and spinning part of the technology and support existing handloom weaving or the spinning weaving combined.

PB80-125719 PC A02/MF A01
Pakistan Council of Scientific and Industrial Research, Karachi.
Utilization of - I. Molasses Distillery Stillage. II. Press Mud
M. Aslam, and A. H. Khan. May 79, 21p

Keywords: *Molasses, *Sugarcane, Industrial waste treatment, Solvent extraction, Materials recovery, Costs, *Distilleries, *Waste recycling, Developing country application, Stillage, Waste utilization, Reverse osmosis, Press mud, Cane sugar.

The report attempts to identify all the options that are available for the utilization of Molasses Distillery Stillage and Press Mud (Cane sugar manufacture by the carbonation process leads to theproduction of up to 8% of press mud on the basis of weight of the care crushed). Spent Wash is a good energy source for microorganisms and has been exploited for the cultivation of fodder yeast, mucelial fungi and mushroom mycellia, in many countries. On account of different plant operations and composition of molasses, stillage from various distilleries varies in composition. Therefore, in order to use any stillage for biomass production, an assessment of its potential as a substrate for fermentation is described.

PB80-125727 PC A02/MF A01
Pakistan Council of Scientific and Industrial Research, Karachi.
Technical Report on Lime Base Lubricating Greases
M. Asiam. Jan 76, 20p

Keywords: Greases, Lubricants, Manufacturing, Production methods, Saponification, Equipment, Materials, Developing countries, *Lubrication, *Industrial plants, Developing country application.

This publication lists manufacturing methods and basic principles of production of Lime Base Lubricating Greases.

PB80-126337 PC A05/MF A01
Economic Associates, Inc., Washington, DC.
Problems Facing Small Companies Performing Research and Development
Frank Piovia. May 79, 81p*
Sponsored in part by National Science Foundation, Washington, DC. Div. of Science Resources Studies.

Keywords: Surveys, Attitudes, Characteristics, Problem solving, Salaries, Fringe benefits, Finance, Regulations, Capital, Manpower, Ranking, Businesses, Research management, *Small businesses, *Research and development.

The report contains the results of a 1977 survey on problems faced by small companies performing research and development. The problems are ranked according to importance. Characteristics of the survey participants are included. The survey was updated in 1979 (See PB80-127830).

PB80-127079 PC A99/MF A01
American Water Works Association Research Foundation, Denver, CO.
Water Reuse--From Research to Application. Proceedings of Water Reuse Symposium, Held at Washington, DC. on March 25-30, 1979. Volume 1
Mar 79, 807p* NSF/RA-790224
Grant NSF-PFR78-21313
Also available in set of 3 reports PC E99, PB80-127061.

Keywords: *Waste water reuse, Waste reclamation, Water conservation, Meetings, Government policies, Potable water, Ground water recharge, Industries, Cooling water, Electric power plants, Petroleum industry, Coal gasification, Aquaculture, Municipalities, Water supply, Sewage treatment, Economic analysis, Law(Jurisprudence), Arid land, Military facilities, Agriculture, Public health, Wetlands, Institutional framework.

The Symposium was devoted to the renovation and reuse of wastewaters from municipal, industrial, and agricultural sources. The proceedings demonstrate that significant global interest exists in wastewater reuse, that recycling concepts are being applied to a broad range of functions, that application of water

reuse may be highly situation-dependent, and that reuse applications are important solutions for the conservation of water. Volume 1 focuses on: (1) Implementation, programs, and potential of water reuse policy; (2) water supply augmentation; (3) industrial recycling and reuse; (4) planning for reuse; and (5) aquaculture, wetlands, and ecosystems.

PB80-127087 PC **A99**/MF **A01**
American Water Works Association Research Foundation, Denver, CO.
Water Reuse--From Research to Application. Proceedings of Water Reuse Symposium, Held at Washington, DC. on March 25-30, 1979. Volume 2
Mar 79, 860p* NSF/RA-790225
Grant NSF-PFR78-21313
Also available in set of 3 reports PC E99, PB80-127061.

Keywords: *Waste water reuse, Water reclamation, Water conservation, Meetings, Research projects, Activated sludge process, Sewage treatment, Netherlands, Osmosis, Water quality, Israel, South Africa, Trickling filters, Nitrification, Canada, Law(Jurisprudence), Potable water, Pilot plants, Denitrification, Institutional framework, Reverse osmosis.

The Symposium was devoted to the renovation and reuse of wastewaters from municipal, industrial, and agricultural sources. The proceedings demonstrate that significant global interest exists in wastewater reuse, that recycling concepts are being applied to a broad range of functions, that application of water reuse may be highly situation-dependent and that reuse applications are important solutions to conservation of water. Volume 2 focuses on international development, institutional factors, and treatment research and development operations.

PB80-127095 PC **A99**/MF **A01**
American Water Works Association Research Foundation, Denver, CO.
Water Reuse--From Research to Application. Proceedings of Water Reuse Symposium, Held at Washington, DC. on March 25-30, 1979. Volume 3
Mar 79, 719p NSF/RA-790226
Grant NSF-PFR78-21313
Also available in set of 3 reports PC E99 PB80-127061.

Keywords: *Waste water reuse, Water conservation, Water reclamation, Meetings, Municipalities, Potable water, Licenses, Coliform bacteria, Irrigation, Water distribution, Automation, Monitoring, Water quality, Sewage treatment, Design criteria, Instrumentation, Military facilities, Farm crops, Pilot plants, Urban planning, Public health, Ground water recharge, Tertiary treatment.

The Symposium was devoted to the renovation and reuse of wastewaters from municipal, industrial, and agricultural sources. The proceedings demonstrate that significant global interest exists in wastewater reuse, that recycling concepts are being applied to a broad range of functions, that application of water reuse may be highly situation-dependent, and that reuse applications are important solutions to conservation of water. Volume 3 focuses on: Municipal reuse; modeling, monitoring, and instrumentation; agricultural reuse; and health and quality considerations.

PB80-127715 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Hydropower - An Energy Source Whose Time Has Come Again
Report to the Congress.
11 Jan 80, 96p* Rept no. EMD-80-30

Keywords: *Hydroelectric power, Development, Projects, Constraints, Evaluation, Assessments, *Energy source development, Energy sources.

Recent price increases in imported oil demonstrate the urgency for the U.S. to rapidly develop its renewable resources. One such renewable resource for which technology is available now is hydropower. Studies indicate that hydropower potential, particularly at existing dam sites, can save the country hundreds of thousands of barrels of oil per day. But problems and constraints--economic, environmental, institutional, and operational--limit its full potential. Federal programs have had little impact on helping to bring hydro projects on line. Specifically, the Department of Energy's Small Hydro Program could do more to overcome hydro constraints and problems through an effective outreach program and more emphasis on demonstration projects.

PB80-128523 PC **A06**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Walnut Insects and Diseases
Forest Service general technical rept. (Final)
Kenneth J. Kessler, Jr, and Barbara C. Weber. Jan 80, 109p Rept no. FSGTR-NC-52
Workshop Proceedings Held at Carbondale, Illinois on June 13-14, 1978.

Keywords: *Plant diseases, *Pest control, Nut trees, Forestry, Meetings, Fungi, Pesticides, Decay, Wood, Defects, Insects, Life cycles, *Walnut, Juglans nigra, Black walnut trees, Butternut trees.

The report contains 17 papers summarizing up to 5 years of recent study on insect and disease problems of the black walnut and butternut trees. The workshop was sponsored by the USDA Forest Service's North Central Forest Experiment Station and was held in Carbondale, Illinois, June 13 and 14, 1978.

PB80-132673 PC **A09**/MF **A01**
Culp/Wesner/Culp, El Dorado Hills, CA.
Management of Small-to-Medium Sized Municipal Wastewater Treatment Plants
Technical rept.
Jul 79, 194p* EPA/430/9-79-013
Contract EPA-68-01-4917

Keywords: *Sewage treatment, Management, Manuals, Planning, Constraints, Budgeting, Financing, Maintenance, Personnel development, Safety, Public relations, Manpower, Contracts, Requirements, *Waste water, Sewage treatment plants, Energy conservation.

This manual is for the managers of small to medium-sized municipal wastewater treatment plants. Although much of the information would be useful to any plant manager, it is primarily aimed at those individuals managing plants in the range of 3 to 10 mgd.

PB80-133622 PC **A12**/MF **A01**
Appropriate Technology Development Association, Lucknow (India).
Appropriate Technology: Directory of Tools, Equipments, Machines, Plants, Processes and Industries. Volume I
Mar 77, 264p

Keywords: Directories, Tools, Agricultural engineering, Industries, *Agricultural machinery, Farm processing, Pottery, Ceramics, Metal working, Rural areas, Materials handling, Health, Hygiene, *Water supply, Developing countries, Houses, Construction, *Housing, Developing country application, Villages.

This directory describes simple technologies and industrial processes for small communities and rural areas with complete illustrations, designs and drawings. It is divided into ten sections: Agro-tools, Hand Tools and Equipment for Crafts, Agro Processing, Village and Cottage Industries, Material Handling and Transport, Health and Hygiene, Education, Training and Culture, Work Power and Energy, Household and Domestics, and Housing and Construction. The introduction at the beginning of each section explains to the reader the concept and philosophy of appropriate technology in addition to providing guidance for its practice. A WHO'S WHO in appropriate technology is included which lists individuals and groups involved in India and abroad.

PB80-133648 PC **A06**/MF **A01**
Warpeha (Paul R.), Hyattsville, MD.
Perceptions of Technology: A Study of the Iluman Project
Master's thesis
Paul Raymond Warpeha. 22 May 79, 106p

Keywords: Composts, *Methane, *Agricultural wastes, *Community development, Sanitation, Technology, Agricultural engineering, Gases, Cooking devices, Theses, Developing countries, *Ecuador, Developing country application, Iluman project.

In 1976, a integrated project of rural development was begun in highland Ecuador as a collaborative effort between Peace Corps Volunteers and indigenous villagers. Its focus was on the cooperative production and use of methane gas(biogas) within the context of the local community and culture, including the parameters surrounding the utilization of agricultural residues, traditional fuel usage patterns, and community health, nutrition, and sanitation systems. This paper documents the history of the Iluman Methane Gas/ Nutrition-Health/ Agriculture Project and specifically studies the impact of international development efforts and technological innovation upon a group of rural people. It deals with culturally defined perceptions of technology and the implications of change, taking into perspective the historical and sociocultural factors which determine the world-view of both the indigenous people and the foreign change agents.

PB80-133788 PC **A04**/MF **A01**
Leet and Leet Consultants, New York.
Selected Articles on Trickle-Up Development
Glen Leet. Aug 79, 65p

Keywords: *Community development, *Socioeconomic status, Developing countries, Economic development, Citizen participation, Productivity, *Employment, Low income groups, Disadvantaged groups, Developing country application, Job development.

The report is a compilation of four articles dealing with the topic of 'trickle-up' community development. This approach to development aims to stimulate growth with equity by involving the poorest of the poor in productive self-help. The articles included are: How to involve people in development; People's productivity: The Leet process; Trickle-up development through aided self-employment; and Trickle-up development in Dominica. The fourth article gives an actual project description, methodology and analysis capable of replication by community development workers in other countries.

PB80-133796 PC **A06**/MF **A01**
Leet and Leet Consultants, New York.
The Use of Modern Computer Telecommunications Systems to Encourage the Participation of People in Development
Glen Leet. 21 Apr 79, 112

Keywords: Developing countries, Telecommunication, *Information services, Development, Real time operations, Computer networks, Time sharing, Minicomputers, Foreign countries, Mexico, Computer applications, Distributed processing, Communications networks, Data bases, Developing country application.

The use of modern telecommunications systems to encourage the participation of people in an integrated, comprehensive national development program is explained. Designed to facilitate communication between sectoral elements and between people and governmental services, it brings to this task the use of telecommunications networks, real-time access, distributed data processing, use of mini-computers and intelligent terminals, and data base storage and retrieval systems. Based on over 30 years' experience in over 50 countries, it involves a deep concern with what motivates people and the use of sophisticated technology to aid them in realizing their aspirations.

PB80-134018 MF **A01**
Intermediate Technology Publications Ltd., London (England).
The Power Guide: A Catalogue of Small-Scale Power Equipment
Peter Fraenkel. c1979, 242p
Microfiche copies only.

Keywords: Catalogs(Publications), *Power equipment, *Solar energy, Solar heating, Engines, Stoves, Water heaters, Methane, Heat pumps, Electric equipment, Developing countries, Electric power generation, Heaters, Developing country application.

This guide is intended to help those seeking to buy small-scale power equipment, particularly for use in remote and underdeveloped parts of the world, by indicating a selection of appropriate commercially available power sources. It gives basic information on the pros and cons and the criteria for choosing a variety of different energy conversion systems, together with a

selection of internationally available items of equipment and the names and addresses of their manufacturers and agents. Additional material on related consultancy and information services, plus a listing of organizations concerned with research and development in small-scale power production is also included.

PB80-137417 PC A03/MF A01
Lyndon B. Johnson School of Public Affairs, Austin, TX.
Location Analysis: A New Tool for Health Planners
Methodological Working Document no. 53
David Eaton, Richard Church, and Charles ReVelle.
May 77, 50p*
Prepared in cooperation with Tennessee Univ., Knoxville. Dept. of Civil Engineering, and Johns Hopkins Univ., Baltimore, MD. Dept. of Geography and Environmental Engineering.

Keywords: Covering, Position(Location), Methodology, Accessibility, Policies, Geography, *Health planning, Health care facilities, Health care requirements, Developing country application, Health services, Location analysis.

The report describes methods to locate facilities with respect to demand patterns for health services so as to maximize the access of people to health care. This set of methods is called covering techniques. They are termed covering techniques because they try to cover people with services within time or distance restrictions. These methods are of interest because they require relatively small quantities of usually-available information, are relatively inexpensive to use, and yield a rich variety of valuable results. Some of these methods are simple enough to be used by a motivated and patient individual, armed only with some basic data on population and distances, a pad of paper, and a pencil. Other methods require a computer to perform the complicated calculations. This report explains what the methods can and cannot do.

PB80-137425 PC A07/MF A01
Lyndon B. Johnson School of Public Affairs, Austin, TX.
Health Resource Allocation in Rural Colombia. Appendix B
Special project rept.
Bryan L. Hamon. Apr 79, 136p
Contract AID/ta-C-1363

Keywords: *Colombia, *Health care delivery, Resource allocation, Health resources, Developing country application.

The report develops two systematic approaches--computer mapping techniques and location analysis--as tools to assist Colombian health officials in planning for the allocation, development and use of rural health resources. Present allocation methods and issues of rural health extension are discussed. Health and demographic data is presented and analyzed for 14 indicators in the State of Valle do Cauca. Computer mapping and health status index are used for comparing various combinations of health and demographic factors. Maximal covering is used to assess three issues related to deployment of ambulances. Information is presented on village population, travel times and distances between villages and the status of existing health services in Zarzal, a five county region in the State of Valle de Cauca, Colombia. Trade-off curves are presented, maps are developed to show how medical vehicles cover rural population.

PB80-138050 PC A03/MF A01
Lyndon B. Johnson School of Public Affairs, Austin, TX.
Analisis de Ubicacion: Una Guia para los Planificadores de Servicios de Salud (Location Analysis: A New Tool for Health Planners)
David Eaton, Richard Church, and Charles ReVelle.
Jul 78, 28p*
Text in Spanish.

Keywords: Covering, Position(Location), Methodology, Accessibility, Policies, Geography, *Health planning, Health care facilities, Health care requirements, Developing country application, Health services, Location analysis.

The report describes methods to locate facilities with respect to demand patterns for health services so as to maximize the access of people to health care. This set of methods is called covering techniques because they try to cover people with services within time or distance restrictions. These methods are of interest because they require relatively small quantities of usually-available information, are relatively inexpensive to use, and yield a rich variety of valuable results. Some of these methods are simple enough to be used by a motivated and patient individual, armed only with some basic data on population and distances, a pad of papor, and a pencil. Other methods require a computer to perform the complicated calculations. This report explains what the methods can and cannot do. Text in Spanish.

PB80-138068 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume III: Perspectives and Methodology
P. O. Woolley, Jr, W. S. Hays, and D. L. Larson. Jun 72, 63p Rept no. DHEW/PUB/OS-72-33

Keywords: *Health, Public health, *Socioeconomic status, Planning, Methodology, Environments, Foreign countries, Rural areas, Developing country application, Health planning, Health care resources.

The monograph uses two perspectives in planning: sectoral and inter-sectoral. Sectoral planning attempts to use fully resource allocations within a given sector. In sectoral planning decision-makers often work with resources immediately under the control of a sector, for example, agriculture or health. However, this does not mean that all resources for successful project implementation are under the control of sectoral planners. Effective planning, therefore, requires the coordination of both sectoral and inter-sectoral planning. Delineating distinct spheres of planning is not an attempt to separate entities but to unify them so that plans can be made, evaluated and restructured according to the critoria.

PB80-138076 PC A07/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume IV: The Philippines
P. O. Woolley, Jr, C. A. Perry, L. J. Gangloff, and D. L. Larson. Jul 72, 143p Rept no. DHEW/PUB/OS-72-34

Keywords: *Health, Public health, *Socioeconomic status, *Philippines, Diseases, Environments, Foreign countries, National government, Rural areas, Developing country application, Health planning, Health care resources.

This country case-study attempts to identify problem areas in health and socio-economic development for the Philippines. Particular attention has been given to the definition of those problem areas influenced by or amenable to change by cooperation between the Philippine government and international assistance agencies. There has been no attempt to develop a specific plan for action but rather to find those areas in which planning might be helpful. This study is based upon the reasoning that there are unifying sociocultural forces that influence the operation of economy, the government, education, health care, etc. Disease, the negative manifestation of health, represents the way in which a population deals with the environment as much as it represents the presence of a disease causing agent. Hence comes the hypothesis that the Philippine society is a result of the concepts of limited good and mutual survival whereby they feel that to enjoy good fortune is necessarily to take it away from someone else. Many kinds of data have been used in this hypothesis, and they uniformly state or suggest this conclusion. This study is consequently not a comprehensive view of the health sector as such but is a survey of the various influences that combine to produce the conditions found in the health sector.

PB80-138084 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. Volume V: El Salvador
P. O. Woolley, Jr, C. A. Perry, and D. L. Larson. Oct 72, 61p Rept no. DHEW/PUB/OS-72-35
Prepared in cooperation with Agency for International Development, Washington, DC.

Keywords: *Health, Public health, *Socioeconomic status, *El Salvador, Diseases, Environments, Foreign countries, National government, Rural areas, Developing country application, Health planning, Health care resources.

The study is a brief overview of the basic health situation in El Salvador. Because of time limitations and scarcity of data, it is a sector assessment rather than an indepth analysis. Certain key problems became obvious; the primary area is malnutrition. There seems to be no programs, either from the government or the assistance agencies, to alleviate this problem. However, the Ministry of Health has proposed to increase the vaccination program to combat the high morbidity and mortality from childhood diseases. Improvement of the nutritional status of the population would have additional benefit for the health and well-being of the population. Another key area is the availability of health services. Some form of health facility is available 85.6% of the people, yet over half of them are not permanently staffed. More sophisticated facilities, however, are fairly evenly distributed throughout the country. El Salvador has a good transportation system, there are not any obvious cultural barriers to seeking modern medical care, and yet the people die from lack of care. The third major problem is sanitation. There is much activity in this area, an encouraging sign. Poor sanitation is one of the basic underlying causes for a large percentage of diseases and until this problem is solved, El Salvador will continue to carry the burden of preventable sickness.

PB80-139108 PC A04/MF A01
Lyndon B. Johnson School of Public Affairs, Austin, TX.
On Deployment of Health Resources in Rural Valle del Cauca, Colombia
Special project rept.
1977, 55p
Sponsored in part by Colombian Ministry of Public Health. Prepared in cooperation with Tennessee Univ. at Knoxville. Dept. of Civil Engineering, and Health Service of Valle del Cauca (Colombia).

Keywords: Deployment, *Colombia, Data collection, Rural areas, Developing country application, Valle del Cauca(Colombia), Health resources, *Health planning.

The papor reports on data collection problem formulation, analysis and conclusions of a joint Colombian-American Study to integrate the use of location analysis into rural health planning in Colombia. Local planners in Zarzal, Valle del Cauca used census data and common sense to determine good centers from which to recruit rural health workers and at which to base ambulances. Their task can be formulated as a maximal covering location problem and was solved with both a heuristic appropriate to the local computer system and integer programming. Location analysis found better centers for health workers than did the local planners, in the terms of reference of the planners themselves. The ambulance deployment study suggested advantages to modifying system management practices. A portion of the specific recommendations have been implemented in Zarzal. The covering techniques are being applied by planners in other areas of Colombia.

PB80-139124 PC A10/MF A01
Lyndon B. Johnson School of Public Affairs, Austin, TX.
The Use of Location Analysis for Siting Health Promotors in Rural Colombia. Appendix A
Vivienne L. Bennett. Apr 79, 220p
Contract AID/ta-C-1363

Keywords: *Colombia, Sites, *Health planning, Health planning, Developing country application, Rural health services, Location analysis, Health care delivery systems.

Report discusses problem of finding sites for minimally trained health care workers, or promotors, in rural Colombia to develop siting methods, the public-sector location analysis literature is reviewed, recent developments are described, from p-median through location set covering to maximal covering. The promotora siting problem, when formulated, turns out to be a modification of the maximal covering location problem in that it is a non-emergency service and the restrictions on potential facility sites are more complex. The study addresses: (1) how a computerized procedure relates to

the conventional Colombian siting methods; (2) the usefulness of these techniques for routine promotora planning; (3) how much data is necessary for effective solutions to the siting problem. Computer results based on Zarzal regime are described and analyzed. Maps and trade-off graphs are used location analysis is shown by quantifying trade-offs between numbers of promotors and the segment of the population covered by the service.

PB80-139637 PC$20.00/MF A01
Volunteers in Technical Assistance, Inc., Mt. Rainier, MD.
International Directory of Appropriate Technology Resources
Brij Mathur. cJul 78, 503p*

Keywords: *Technology transfer, Technology, Resources, Directories, Foreign countries, Cooperation, Organizations, Developing country applications.

The international directory lists organizations involved in Appropriate Technology alphabetically by country and provides lists of publications, reports, papers, etc. published by these organizations. There are over 250 entries compiled in 1977 from responses to a mailed questionnaire as well as newsletters and current directories of AT institutions. A subject index is also provided.

PB80-139751 PC A02/MF A01
Solar Solution, Inc., Washington, DC.
Electricity from the Wind: A Guide for the Generalist
Paul Bendick. 1978, 23p

Keywords: *Wind energy, Wind power generation, Windmills, Instructions, Developing country application, Windpowered generators, Wind power.

This guide was compiled and written for the generalist working in developing countries who are considering the option of using wind energy to generate small amounts of electricity. It is not intended to be comprehensive nor should it be read as a technical bulletin. It presents basic information to the reader who knows little about the subject and will help him/her to decide whether wind energy should be explored as a practical answer to a specific energy need. Discussed in the paper are wind electric systems, measuring the wind, determining electrical needs, selecting components, and listings of commercial dealers, manufacturers and distributors. Financial considerations are also discussed.

PB80-144025 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Search for Appropriate Technology for the United Kingdom Paper and Board Industry
Background paper
D. Attwood. 18 Oct 78, 17p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Paper, Paper industry, Paperboards, *Great Britain, Market surveys, Raw materials, Pulp mills, Papermaking, Paper products, Developing countries, Developing country application, Waste recycling, Paper recycling.

Paper and board are internationally traded products, and most national industries have similar characteristics and problems. In recent years world market conditions have been unfavorable, and the UK paper and board industry has faced severe problems. This paper describes the structure of the current UK paper and board industry and sets this in the context of the common market (EEC) and world scene. The problems in finding indigenous raw materials are described and the role wastepaper plays as a raw material is discussed. The problems caused by the size new pulp mills have to be, to be viable, is examined, especially in the context of building new straw pulping plants which could integrate with existing paper and board mills.

PB80-144033 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Technological Choices in Sugar Processing
Background paper
G. B. Hagelberg, and E. W. Krause. 5 Oct 78, 53p
Report of Working Group No. 4, Appropriate Technology for the Production of Sugar. Prepared in cooperation with Intermediate Technology Development Group, London (England).

Keywords: *Sugar, Agricultural products, Processing, Manufacturing, Technology, Research, Development, Developing countries, Developing country application.

The report covers sugar manufacturing technologies and products; criteria for the comparison and evaluation of alternative sugar processing technologies; and directions of research and development in the field of intermediate sugar processing technologies.

PB80-144041 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Provision of Drugs by Appropriate Technology
Background paper
Paul Dunnill. 3 Oct 78, 36p
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals. Sponsored in part by Agency for International Development, Washington, DC. Prepared in cooperation with Intermediate Technology Development Group, London (England).

Keywords: *Drugs, Supplying, Requirements, Medical services, Drug industry, Chemical industry, Technology, Developing countries, Developing country application.

The first part of the report outlines the technical considerations which lead the Intermediate Technology Development Organization (ITDG) to develop its current policy. These include: The problem of supply; production of basic chemicals; drugs from microbial sources; drug compounding; the pharmaceutical auxiliary; and other technologies needed for drug production. The objectives of a current project are then described. A brief analysis is given of the ways in which government policies influence the provision of drugs particularly to poor rural communities. An appendix lists technology appropriate to different types of countries. A bibliography is included.

PB80-144058 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Cement and Building Materials
Discussion paper.
18 Oct 78, 21p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: *Building materials, Construction materials, *Cement, Construction, Planning, Technology, Research, Industries, Developing countries, Developing country application.

The strategy for the development of building materials industries in developing countries is discussed. The contents of the document include a discussion of the problem; objectives; technological needs and alternatives; appropriate construction and planning techniques; research and development; policy implications:; and program of action.

PB80-144066 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Small-Scale Rural Industries: Light Engineering Workshops
Background paper
V. Austin. 3 Oct 78, 56p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops. Prepared in cooperation with Intermediate Technology Development Group, London (England).

Keywords: *Small businesses, *Industrial development, Industries, Rural areas, Products, Services, Marketing, Technology, Requirements, Industrial plants, Developing countries, Local government, Policies, Developing country application.

Small scale rural industries can make a major contribution to assist the poor and especially the landless, in the rural areas of developing countries. At present, the amount of assistance given by national and international programs is relatively negligible, and from the author's experience, virtually all rural industrial activities at the field level in developing countries are without adequate direct government assistance. If a modest start is to be made to help provide some additional employment and incomes for the poor of rural areas through non-farm activities, a massive training program must be started now, and supported by adequate services, at both the national and international levels.

PB80-144686 PC A10/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Microbial Processes: Promising Technologies for Developing Countries
Final rept.
Feb 80, 215p* Rept no. CIR/BOSTID-80/28
Contract AID/csd-2584

Keywords: *Plants(Botany), *Drugs, *Microbiology, Microorganisms, Food, Feeding stuffs, Plants(Biology), Nutrition, Nitrogen fixation, Insect control, Energy, Fuels, Antibiotics, Vaccines, *Waste treatment, *Cellulose, Cultures(Biology), Regulations, Developing countries, Waste utilization.

Ten subpanels selected a number of microbial processes that met either of the following criteria: (1) The process can be beneficially employed in developing countries, or (2) The process has sufficient potential for developing countries to merit research and development for future use. Microbes can be marshaled to aid in solving many important global problems including food shortages, resource recovery and reuse, energy shortages, and pollution. Microbiology is particularly suited to make important contributions to human needs in developing countries, yet it has received comparatively little attention. The range of possible applications covers uses by individuals and industries in rural settings, villages and cities. The ten subject areas covered include raw materials for microbial processes, food and animal feed, soil microbes in plant health and nutrition, nitrogen fixation, microbial insect control agents, fuel and energy, waste treatment and utilization, cellulose conversion, antibiotics and vaccines, and pure cultures for microbial processes.

PB80-145238 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. VI: Haiti (Revised)
Arne Barkhuss, and John A. Daly. 1976, 98p Rept no. DHEW/PUB/OS-76-50025

Keywords: *Health, *Socioeconomic status, *Haiti, Tropical diseases, Public health, Models, Socioeconomic factors, Latin America, Developing country application, Health services, Health planning, Health resources.

A description and analysis of the health problems and programs in Haiti, a major recipient of international assistance. Its object is to document intervention in Haiti's health system which will contribute to its socioeconomic development, and the effects of other developmental activities on health. Recommendations for specific action, however, are not part of the project. Chapters in this study cover: (1) Population and Health Status: Vital statistics; (2) Conditioning Factors: Climate and Topography, culture and history, political situation, education and communication, economy, housing and sanitation, (3) Nutrition and Agriculture; (4) Organization of Public Health Services; financial resources; health infrastructure, health manpower, training of personnel; (5) National Health and Development

Planning; (6) Health Assistance Offered by International Organizations, Bilateral Assistance, and Assistance Offered by Voluntary Agencies.

PB80-145246 PC A09/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XIV: Zaire
Karen E. Lashman. Jun 75, 189p Rept no. DHEW/PUB/OS-75-50019

Keywords: *Health, *Socioeconomic status, *Zaire, Tropical diseases, Africa, Public health, Models, Socioeconomic factors, Developing country application, Health services, Health planning, Health resources.

Zaire is rich in resources, poor in productivity, and with a hot, tropical climate provides a vast incubator for numerous debilitating diseases. High morbidity and mortality in Zaire, notably in the under-five years of age population, largely could be eliminated or substantially reduced through preventive health measures, extension of potable water and sewerage systems, coupled with improved availability of food and a general upgrading of the basic quality of living conditions. Malnutrition, chiefly a protein deficiency, is widespread and actually may be increasing. The problem and possible approaches to resolving malnutrition is urgent. Several different approaches may be needed to remedy health and health-related problems, given the diverse problem-resource mixes of the various geographic areas. Because of the synergistic relationship among health, nutrition, environmental sanitation, and population growth, development of an integrated public health delivery system promises the most cost-effective method to extend coverage rapidly, particularly for the largely unattended rural population. To support such programs, substantial changes will have to be made in the health system infrastructure, including better training, greater fiscal allocations, and more equitable distribution of services.

PB80-145253 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. XVI: Arab Republic of Egypt
Arthur H. Furnia. Sep 75, 86p Rept no. DHEW/PUB/OS-76-50026

Keywords: *Health, *Socioeconomic status, *Egypt, Tropical diseases, Public health, Models, Socioeconomic factors, Africa, Developing country application, Health services, Health planning, Health resources.

This rather thorough study of Egypt's health and socioeconomic development examines the following topics: (1) history, culture, and geopolitics; (2) population characteristics and human resources; (3) health issues, policies, and problems; (4) Egypt's health system and health plans; (5) environmental services; (6) health manpower resources; (7) nutrition; (8) population programs; and (9) foreign assistance. There are a concluding summary and suggestions for improved health care. Among them research, planning, and evaluative strategies are seen as required urgently. For the improved training of health personnel, Egyptian physicians lack specialized training but it is felt that enough health technicians are being trained. Adequate supplies of potable water and adequate sanitation also are needed. Measures for preventing and eradicating disease are essential, as are family planning and nutrition programs. Finally, it was found that the Egyptian Ministry of Health is deficient in data collection and analysis, health planning and efficient health care delivery.

PB80-145345 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. II: Honduras
P. O. Woolley, C. A. Perry, W. S. Hays, and D. L. Larson. May 72, 82p Rept no. DHEW/PUB/OS-72-32

Keywords: *Health, *Socioeconomic status, *Honduras, Public health, Models, Socioeconomic factors, Latin America, Developing country application, Health services, Health planning, Health resources.

This study has found that a comprehensive integration of the resources that Honduras has at hand surely would help the country break out of its circular dilemma of disease-poverty-disease. That the major diseases from which the population suffers - malaria, intestinal parasitism, malnutrition, and respiratory diseases - are preventable and fall under the jurisdiction of already established government programs points to the fact that such programs deserve a higher priority and better administration. The health sector appears to be inadequate because of the inadequacies of other public sectors. For example, the Honduran population suffers from malnutrition because most of the high-protein food raised in Honduras are exported. Enteric infections run rampant because water and sewerage systems are virtually non-existent, and water supplies are contaminated by human activity. Health care education counts for little as few Hondurans finish secondary school. With only 65% of the available hospitals beds in use, yet with over one-third of the population never receiving any health care whatsoever, efforts at increased communication and availability should be made. In addition, direct concentration on agricultural development, adequate water systems, education, and improved disease eradication procedures are in order. Much of this depends upon administrative reform. These steps are designed to make better use of existing health facilities and to change the relationship between the health sector and other sectors from a negative one to a positive one, thereby reversing the current trend of a population outdistancing its means of support.

PB80-145741 PC A06/MF A01
Intermediate Technology Publications Ltd., London (England).
Farm Equipment Development Project, Daudawa, N.C.S., Nigeria
c1974, 119p

Keywords: *Agricultural machinery, Agronomy, Weed control, Herbicides, Farm crops, Harvesting, Animals, Equipment, Manufacturing, *Nigeria, Developing country applications.

Information already available was co-ordinated to provide an outline of the pattern of agriculture in the project area. Weeding was identified as a labor bottleneck limiting crop production on farms employing animal draught for land preparation. Improvement in methods of weed control was made the primary objective of the project. Implements were developed for applying liquid and granular herbicides, for mechanical weeding, for harvesting groundnuts and for processing kenaf. Single ox harness for light draught work was introduced into the area. The more promising machines were demonstrated and tried out by local farmers. Four mechanical weeders, a groundnut lifter and single ox harness were found to be suitable for use in the northern states of Nigeria at the present time. All items were designed for local construction from easily available materials, using simple equipment. Prototypes were built at the project workshop, but additional machines for farmer testing were commissioned from local entrepreneurs as a step towards initiating local manufacture. Manufacturing instructions for the successful machines were drawn up in a form suitable for publication in different languages and for interpretation by non-engineers. (Copyright (c) Intermediate Technology Publications Ltd. 1974.)

PB80-146798 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Textiles
Discussion paper.
19 Oct 78, 17p
Report of Working Group No. 3, Appropriate Technology for the Production of Textiles.

Keywords: Textile processes, *Textile industry, Textile finishing, Research, Technology, Developing countries, Weaving, Spinning(Staple fibers), Developing country application.

The textile industry in developing countries is discussed in this report along with a review of alternative technologies. Decentralized spinning, areas of research and development, technology of finishing, and policy implications are included.

PB80-148806 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Rural Industries
Background paper
A. D. Adhikari. 4 Oct 78, 84p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.

Keywords: *Industrial development, *Small businesses, Industries, Rural areas, Engineering, Production, Plant location, Industrial plants, Technology, Requirements, Guidelines, Policies, Developing countries, Developing country application.

The principal needs of rural areas in the development of rural industries are discussed in terms of agricultural inputs and goods consumption. An analysis is given of the adoption and diffusion of appropriate technology, linkages between urban and rural sectors, and policy incentives and concessions.

PB80-146830 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Bricks and Ceramics: Aims and Approaches
Background paper
I. Knizek. 18 Oct 78, 15p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: *Bricks, *Ceramics, Manufacturing, Structural day products, Tools, Equipment, Abilities, Technology, Developing countries, Developing country application.

Some approaches to choosing appropriate technology by two examples taken from the manufacture of ceramics and fired clay bricks are given. The criteria discussed for the choice of appropriate technology include the availability of skills and the characteristics of the market.

PB80-146939 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Planning and Development of Animal Energy Resources in India
Background paper
N. S. Ramaswamy. 18 Oct 78, 28p
Report of Working Group No. 11, Appropriate Technology for Rural Energy.

Keywords: *India, *Animal energy, Animals, Transportation, Resources, Rural areas, Urban areas, Farms, Work measurement, Productivity, Breeding, Animal husbandry, Developing countries, Developing country application, Villages.

The potential of animal resources in relation to other energy sources is assessed in a techno-socio-economic context.

PB80-146947 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for the Production of Oils and Fats
Background paper.
19 Oct 78, 29p
Report of Working Group No. 9, Appropriate Technology for the Production of Oils and Fats.

Keywords: *Vegetable oils, Oils, Fats, Agricultural products, Processing, Oilseeds, Manufacturing, Objectives, Planning, Technology, Developing countries, Developing country application, Villages.

A review is provided of alternative technologies for the oils and fats industry. Some policy implications are

considered and a technological plan of action is presented. Various farm/village-level and commercial-level oilseed processing methods are described in an appendix.

PB80-147325 PC A06/MF A01
Public Health Service, Rockville, MD. Office of International Health.
SYNCRISIS: The Dynamics of Health. An Analytic Series on the Interactions of Health and Socioeconomic Development. I: Panama
P. O. Woolley, Jr, C. A. Perry, and R. N. Eccles. May 72, 108p Rept no. DHEW/PUB/OS-72-31

Keywords: *Health, *Socioeconomic status, *Panama, Tropical diseases, Public health, Models, Socioeconomic factors, Latin America, Developing country application, Health services, Health planning, Health resources.

The country profile of the Republic of Panama provides a study of its health conditions and their impact upon socio-economic development, and a model for the definition and evaluation of its health problems. In general, the approach has been to review and analyze readily available data in order to identify the most prevalent and severe as indications of disease occurrence and spread. Part One of this report is an analysis of the physical-geographic areas - the living conditions contributing to poor health; the problems of over-burdening health care resources by a growing population; the diseases relating to socio-economic development; the economic and social costs of these diseases; the malnutrition complicating other problems and as a problem within itself. Part Two identifies the resources of the health sector, viewed from the perspective of both recipients of care and the providers of care - domestic and foreign agencies and formal relation to present health conditions; and finally a summary of the demands of the population upon the health sector, which describes the factors affecting these demands and assesses the current use of the health resources in light of these demands.

PB80-147762 MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Rural Workshops in Developing Countries
Background paper.
Oct 78, 30p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.
Available microfiche only because of poor quality.

Keywords: *Small businesses, Rural areas, Meetings, Developing countries, Objectives, Organizations, Management, Industries, Maintenance, *Agricultural machinery, Tools, Equipment, Developing country application, Villages.

The paper provides a background study of rural workshops. The topics covered include: the present situation; objectives; model rural workshops; organization of rural workshops; relations between the organized sector of the engineering industry and rural workshops; and the number and location of rural workshops.

PB80-147770 MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Agricultural Machinery and Implements
Discussion paper.
19 Oct 78, 30p
Report of Working Group No. 7, Appropriate Technology for the Production of Agricultural Machinery and Implements.
Available in microfiche only because of poor quality.

Keywords: *Agricultural machinery, Developing countries, Technology, Farms, Equipment, Irrigation, Farm crops, Fertilizing, Soil conservation, Cooperation, Policies, Developing country application.

The discussion covers the outlook of mechanization in developing countries; mechanization policy at the farm level; alternative technologies in mechanization; alternative technologies in production of farm equipment; policy implications of alternative technologies; and the role of international cooperation.

PB80-147788 MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Choice of Appropriate Packaging Technology
Background paper.
4 Oct 78, 47p
Report of Working Group Nos. 1-12.
Available in microfiche only because of poor quality.

Keywords: *Packaging, Packaging materials, Natural resources, Technology, Planning, Cooperation, Containerization, Containers, Developing countries, Developing country application.

The report discusses the role of packaging, use of indigenous materials as a basis for growth, packaging for domestic and export trade, transport, packaging research and training, packaging as a system, appropriate technology, planning for packaging, international cooperation, and the role of international agencies. Appendixes include information involving packaging of agricultural products, cement, light engineering products, textiles, drugs, and capital goods.

PB80-147796 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Light Industry Technologies and Rural Development
Background paper
K. H. Yap. 3 Oct 78, 48p
Report of Working Group on Conceptual and Policy Framework for Appropriate Industrial Technology.

Keywords: *Industrial development, Industries, Rural areas, Agricultural machinery, Agricultural products, Processing, Development, Fruits, Water supply, Technology, Developing countries, Electric power generation, Developing country application.

The perspective for rural areas in achieving gradual progress through introduction of industrial technology is provided. Annexes give information on providing for safe water requirements; local production of industrial products for rural requirements; production and export of tropical fruits; and a background on rural electrification.

PB80-147903 PC A15/MF A01
Community Research Group, Los Angeles, CA.
Handbook for Community Economic Development
Final rept.
Syyed T. Mahmood, and Amit K. Ghosh. 1979, 334p* EDA-ERD-80-012
Grant EDA-OER-636-G-78-28, EDA-99-7-13446

Keywords: *Socioeconomic status, *Community development, Handbooks, Citizen participation, Organizations, Economic development, Project planning, Investments, Evaluation, Federal assistance programs, California, Los Angeles(California).

The publication is a 'how to' manual for community development organizations. Topics discussed at length and illustrated include: 'Background on Community Economic Development' and 'The Development Process.' The last topic breaks down into these subsections: Initial Assessment, Investment Strategy, Individual Project Planning and Packaging, Implementation, and Evaluating the Development Process. A glossary of terms and descriptions of federal programs which community development organizations can utilize for community economic development are included.

PB80-147937 PC A99/MF A01
International Center for Arid and Semi-Arid Land Studies, Lubbock, TX.
Arid Land Plant Resources: Proceedings of the International Arid Lands Conference on Plant Resources Held at Lubbock, Texas on October 8-15, 1978
J. R. Goodin, and David K. Northington. Jul 79, 735p* NSF/RA-790353
Grant NSF-AER76-24472, NSF-AER76-82387
Sponsored in part by Grant NSF-ISP77-04295.

Keywords: Plant ecology, *Plants(Botany), *Arid land, Semiarid land, Meetings, *Deserts, Forage crops, Medicinal plants, Tolerances(Physiology), Droughts, Soil properties, Harvesting, Salinity, Plant physiology, Food supply, Ornamental plants, Economic analysis, Soil water, Plant growth, *Jojoba, *Guayule, Juncus.

This report covers developments of new and unused arid land plant resources for food, forage, medicinal, and industrial uses. This subject is especially pertinent in view of the alarming rate at which an ever-increasing global population consumes existing developed resources. The origin and evolution of arid and semi-arid lands are described with emphasis on desert soils and vegetation. Examples of papers on plant resources for the various applications include studies of the jojoba, guayule, and juncus plants, woody plants and fuels from biomass, and salt tolerant crops (the latter harvested for direct human consumption). The workshops comprise research topics together with plant ecology, management, and improvement.

PB80-148034 PC A07/MF A01
Instituto Interamericano de Ciencias Agricolas-OEA, Guatemala City.
Seminario Nacional Sobre Administracion de la Politica Agricola (National Seminar on Agricultural Policy)
Benito Nunez, J. L. Monterroso, and L. de las Casas. Jun 78, 147p
Text in Spanish.

Keywords: *Agriculture, Meetings, Policies, Objectives, Research, Equipment, El Salvador, Guatemala, Nicaragua, Honduras, Developing countries, Developing country application.

Included in the report are lectures from Iowa State University, Honduras, El Salvador, Nicaragua, and Guatemala. The objectives of the seminar were to discuss better methods of research, to analyze the political frame on agricultural matters, study strategies, and develop devices. Conclusions and recommendations are included.

PB80-148042 PC A08/MF A01
HIDROSERVICE - Engenharia de Projectos Ltda., Sao Paulo (Brazil).
Planificacion de Aprovechamientos Hidroelectricos Y Sistemas Electricos Interconectados (Planning of Hydroelectric Development and Power Grids)
L. Ribeiro, J. Aguilera, G. Moamar, and W. Camargo. 14 Jun 79, 174p
Text in Spanish.

Keywords: *Hydroelectric power, Meetings, Planning, Systems engineering, Optimization, Electric power transmission, Foreign technology, Developing country application.

This is the final report of a seminar held in Peru to review approaches to planning hydroelectric projects. Three areas are covered: (1) the three steps of inventory, pre-feasibility and feasibility studies are treated as a coherent system, with consideration of topography, geology, engineering studies and cost-benefit and evaluation methodologies; (2) optimization of hydroelectric development using most successful methodologies based on experience in other Latin American countries; and (3) operational integration of hydrothermal systems, covering all aspects of this type of system: planning, production, and programming.

PB80-148786 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Light Engineering and Rural Workshops in Egypt
Background paper.
27 Oct 78, 32p

Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.

Keywords: *Industrial development, *Small businesses, Engineering, Rural areas, Industries, Development, Egypt, Developing countries, Developing country application.

The topics discussed in the report include a short historical review of the government programs in rural development; the Institute of Small-Scale Industries (ISSI); the Engineering and Industrial Design Development Centre (EIDDC); regional distribution of industry in Egypt; problem areas in light engineering and rural industries; and some profiles of light engineering industries in rural areas.

PB80-148893 PC A04/MF A01
Agency for International Development, Washington, DC.
Materiel de Traitement des Semences (Seed Processing)
John E. Osguthorpe. 1962, 60p
Text in French.

Keywords: *Seeds, Grains(Food), Farm processing, *Agricultural machinery, Separation, Storage, Transportation, Farms, Developing country application.

Seed processing is an important part of modern as well as traditional agriculture. Seeds may be separated by size, length, weight, surface texture, shape, and even by color (with an electric eye). Various screens, machines, and devices, their principle of operation, setting of controls, and use are described to give the farmer the widest choice possible to find the methods most appropriate to his needs. The separating and processing implements covered are winnowers, sieves and screens, sieves with brushes, oscillatory sieves, spiral separators, trimming machines, inclined conveyor belts, velvet rollers pneumatic separators, suction devices, toothed drums, disc separators, and gravity separators using blowers. Husking, scarification, storage, and transportation of the grain are also covered. Various types of grain conveyors and how to determine the appropriate size of different shaped holes in screens is outlined.

PB80-148901 PC A03/MF A01
Department of Agriculture, Washington, DC.
Cuirs et Peaux: Depouillement, Salage, Empaquetage (Hides and Skins from Locker Plants and Farms)
J. Naghski, and I. D. Clarke. 1962, 50p
Text in French.

Keywords: Hides, *Leather, Cattle, Tanning materials, Processing, Storage, Packaging, Quality, Pest control, Developing country application.

The sale of leather can be a lucrative addition to the income of a farmer who raises livestock for food, if the hides are properly prepared. A description of the proper preparation of the animals to be slaughtered and the choice and use of necessary tools introduces the art of skinning. It is followed by detailed and explicit step-by-step instruction on how to skin cattle, and the special considerations needed to adapt that method for the skinning of other farm animals. The type and preparation of salt for tanning the hides and the siting and climate for the tanning facility are covered along with the specific considerations necessary for the various animals. The removal of excess salt from the hides, and their folding and packaging is then covered as is labeling, shipment, and storage of hides, safe from pests. A section on how to judge flaws in the hides from disease, parasites, injury, and branding while the animal is still living, to damage done during slaughter, skinning, and tanning is included, which explains how much such damage reduces the value of the hides. The classification of hides by quality and weight for industrial use is also covered.

PB80-148919 PC A03/MF A01
Department of Agriculture, Washington, DC.
Comment Determiner les Besoins du Sol en Elements Nutritifs (How to Determine Nutrient Needs)
Frank G. Viets, Jr, and John J. Hanway. 1952, 32p
Text in French.

Keywords: *Fertilizers, *Soils, Agronomy, Soil properties, pH, Nutrients, Plant growth, Soil fertility, Fertilizing, Developing country application.

The booklet tells how to determine if a soil needs enrichment by judging the health and productivity of the plants as well as by chemical tests. Testing the pH level of the soil is covered as is analysis of plant tissue for specific nutrients. An explanation of how to translate test results into precise measures of what kind of fertilizer is needed is also covered. Several graphs are included to illustrate the explanations given.

PB80-148927 PC A08/MF A01
Department of Agriculture, Washington, DC.
Les Petites Scieries (A Small Sawmill Enterprise)
Fred C. Simmons. Apr 59, 119p
Text in French.

Keywords: *Woodworking, *Sawmills, Machinery, Lumbering, Machine tools, Equipment, Saws, Expenses, Safety, Maintenance, Operations, Developing country application.

The publication describes machinery and processes for conversion of logs into lumber as an industrial enterprise from both the mechanical and business aspects. It does not include the processes of extracting logs from forests or the seasoning of products of sawmills. It is useful to those considering the establishment of a sawmill business and may be helpful to those already conducting such a business. The selection, erection, and operation of small circular sawmills of standard and traditional types are described. Machine tools, saws, costs, labor, safety, equipment, storage, insects, maintenance, efficiency, and industrial procurement are discussed.

PB80-148935 PC A06/MF A01
Mississippi State Univ., Mississippi State.
L'Essai au Tetrazolium pour Determiner la Vitalite des Semences (The Tetrazolium Test for Seed Viability)
1962, 103p
Text in French.

Keywords: *Seeds, Viability, Tests, Germination, Grain crops, Grasses, Vegetable crops, Color, Developing country application, Tetrazolium compounds.

Seeds can be treated with tetrazolium to determine if they are viable. A brief review of physical, chemical, color, and enzymatic tests for viability are reviewed, and the chemical mechanism of the tetrazolium reaction described. The structure and function of seeds and sprouts of graminaceae and dicotyledons is explained, and the basic methods of testing is covered, listing material and equipment needed. Preparation of tetrazolium solutions; choosing seed samples; treatment, preparation, and coloration of the seeds is outlined and the principles of analysis defined. Interpretation of seed coloration by tetrazolium testing is covered in detail for maize, wheat, sorghum, rice, fescue, paspalum, couch-grass, cotton, soya, vetch, clover, water melon, and radish with up to 16 illustrations for each variety of seed showing different patterns of coloration and their meaning.

PB80-148943 PC A03/MF A01
Department of Agriculture, Washington, DC.
La Direction des Cooperatives Agricoles (Managing Farmer Cooperatives)
Kelsey B. Gardner. 1962, 35p
Text in French.

Keywords: Management, Policies, Operations, Developing country application, Cooperatives, *Agricultural cooperatives.

For an agricultural cooperative to function efficiently, it is important that its members assume their responsibilities. The functions of managers, members, and administrators are elaborated. Separate sections are devoted to the tools of the management; the rights and responsibilities of the membership; choosing administrators--their qualifications, responsibilities, and number; cooperative politics; the consultative committee of the administration; the choice, qualifications, functions, and responsibilities of a director; responsibility of the employees to the consultative committee and the cooperative's members; and common questions on farmers cooperatives.

PB80-148950 PC A02/MF A01
Department of Agriculture, Washington, DC.
Comment Evaluer les Resultats de la Vulgarisation Agricole (Six Keys to Evaluating Extension Work)
Laurel K. Sabrosky. 1958, 20p
Text in French.

Keywords: Services, Evaluation, Effectiveness, Objectives, Developing country applications, *Agricultural extension services.

Evaluation of the results obtained from an agricultural extension program is vital to the project's overall success. Six keys for effective evaluation are explained in detail. In brief they are: Define your objective in terms of change of behavior of those whom you wish to educate; only the targets of your teaching can bear witness to your success or failure; those individuals whom you choose as a proof of your success must be representative of the whole target group; the methods used to furnish your evaluative information must be appropriate to the type of information furnished; formulate your evaluative questions so as to obtain basic and impartial answers; and decide how you will analyze and use your results before you decide their value and meaning.

PB80-148968 PC A08/MF A01
National Project in Agricultural Communications, East Lansing, MI.
Vulgarisation Agricole: Les Auxiliaires Visuels (Visuals in Agricultural Extension Programs)
Robert J. Ames, George H. Axinn, Landis S. Bennett, and Ellis Clough. 1962, 155p
Text in French.

Keywords: Handbooks, Specialized training, Instructional materials, Training devices, Developing country applications, *Agricultural extension services, Visual aids.

The handbook is for those who are engaged in the world-wide movement of improving agricultural efficiency through extension education. The value and use of visuals in teaching new ideas is emphasized. Many useful visual aids for communicating new agricultural methods are described. They include samples, specimens, models, photographs, blackboards, flip charts, flash cards, charts and graphs, and projected aids such as slides and movies. The most effective use of these techniques is explained, and later chapters study more complex presentations such as theatre groups, use of media, reproduction of materials, and how to teach others to use visual aids.

PB80-148976 PC A04/MF A01
Department of Agriculture, Washington, DC.
Vulgarisation Agricole: L'Elaboration des Rapports (Extension Reports)
1962, 56p
Text in French.

Keywords: Project planning, Efficiency, Documentation, Reporting, Services, Developing country application, *Agricultural extension services.

The preparation of reports is an essential part of a successful agricultural extension service. The value and use of reports for logical project planning and control is explained, and methods to gain the most use from reports are described. The booklet outlines the steps to put an efficient system for preparing reports into operation and how to determine the most effective frequency for a periodic report. Short and long term reports, their contents, and documentation necessary for their preparation are discussed, and basic outlines for various reports are provided.

PB80-148984 PC A03/MF A01
Wilmington Coll., OH. Dept. of Economics and Business Administration.
Le Contremaitre au Service de la Petite Industrie (The Foreman in Small Industry)
Philip E. Henderson. 1962, 44p
Text in French.

Keywords: *Small businesses, *Management techniques, Industries, Supervisors, Personnel management, Personnel development, Industrial relations, Job analysis, Developing country application.

All aspects of the foreman's job are elucidated in this booklet. First, the tasks, responsibilities, and authority of the foreman are explained with particular emphasis on the special problems of a foreman in a small factory. The foreman's responsibilities discussed in detail are making up production delays, maintaining qualitative norms, holding down production costs, and increasing efficiency. The foreman's role in training new employees, employees promoted to new posts, and substitute workers is studied, and his relations and rapport with the workers, other foremen, his supervisors, unions, and the public are outlined. A final section discusses the qualities of a good foreman, how to find suitable candidates for foremen, their training, how to measure results, and how management can develop its foremen's abilities.

PB80-148992 PC A05/MF A01
Small Business Administration, Washington, DC.
Petite Entreprise: Les Relations Humaines (Human Relations in Small Industry)
John Perry. 1954, 88p
Text in French.

Keywords: *Management techniques, Industrial plants, Personnel management, Public relations, Attitudes, Morale, Labor relations, Counseling, Industrial relations, Developing country application, *Small businesses.

Proper attention to a plant's human relations is vital to its smooth operation. The effects of favorable and unfavorable attitudes are studied, and the role of the businesses director in creating a good working atmosphere is discussed. Other subjects investigated are the spirit and comportment of the work groups, how to analyze and promote the satisfaction of the workers, the cost of dissatisfaction, foundation of a good organization, worker participation, the role of a work counsellor, and choice of a director of human relations.

PB80-149008 PC A07/MF A01
Michigan Univ., Ann Arbor. Graduate School of Business Administration.
Petite Entreprise: La Comptabilite Industrielle (Cost Accounting for Small Manufacturers)
K. Lee Brummet. 1962, 127p
Text in French.

Keywords: *Management techniques, Accounting, Manufacturers, Records management, Prices, Financial management, Purchasing, Budgeting, Developing country application, *Small businesses.

A small manufacturing business has different accounting needs from a larger one, and the accounting system must be adopted to the particular needs of each business. This book explains in detail various accounting measures to enable a small industry's manager to record, analyze, and interpret the effect of his commercial operations on the finances of his enterprises, and to determine the price at which his goods should sell. Different chapters are devoted to job costing, accounting by production stages, accounting for raw materials and bought components, accounting for labor, accounting for overhead, use of predetermined or standard costs, and writing a budget and forecasting profits.

PB80-149016 PC A07/MF A01
Albany Medical Coll., NY.
Puericulture: La Periode Prenatale (Prenatal Care)
Muriel W. Brown. 1962, 129p
Text in French.

Keywords: *Children, *Health care delivery, Medical services, Medical examination, Nutrition, Hygiene, Clothing, Birth, Health, Infants, Developing country application, Prenatal care.

The book is a comprehensive guide to proper prenatal care for a baby. A section on medical care covers physical examinations, sexual activity, natural childbirth, and general concerns for the health of the child during pregnancy. The development of the child in the womb is explained and proper diet, health, hygiene, and clothing for the mother are outlined. Special precautions during work and travel are also covered. Changes in the mother's emotions and feelings are explained, and the necessary family adjustments for the new baby discussed. Preparation for confinement and labor, including home birth are outlined. The equipment needed for the new baby that should be on hand is also listed and explained. Diseases and discomforts associated with pregnancy and their control are studied as are complications at birth. Labor is explained and described in detail with its complications and remedies. Post-natal care of mother and child including bathing, diet, health, care of breasts, exercise, feeding; and special care for premature babies are also covered in detail.

PB80-149024 PC A08/MF A01
Texas Transportation Inst., College Station.
Batir en Terre (Handbook for Building Homes of Earth)
Lile A. Wolfskill, Wayne A. Dunlap, and Bob M. Gallaway. 1962, 169p
Text in French.

Keywords: *Adobe, *Houses, Earth, *Soils, Foundations, Roofs, Walls, Compacting, Construction, Developing country application.

Contents: Introduction - Types of earth houses; soils and what can be done with them; soil stabilizers; site preparation; foundations; lightweight roofs; getting the soil prepared; making adobe blocks; making pressed earth blocks; making walls of pressed blocks; making walls of rammed earth; roofs for earth houses; floors for earth houses; surface coatings.

PB80-149065 MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for the Iron and Steel Industry
Background paper.
9 Oct 78, 100p
Report of Working Group No. 1, Appropriate Technology for Heavy Industries.
Available in microfiche only because of poor quality.

Keywords: *Steel industry, Iron and steel industry, *India, Steel making, Steel plants, Demand(Economics), Raw materials, Consumption, Technology, Developing countries, Developing country application, Appropriate technology.

An analysis is given of the appropriateness of the present steel technology for India; the causes for deviations; and a strategy for developing and adapting steel technology in India.

PB80-149495 PC A03/MF A01
Pakistan Council of Scientific and Industrial Research, Karachi.
Selection of Production Processes for Utilization of Molasses
Industrial Study Series
F. H. Shah. c1973, 48p Rept no. MONO-1
Errata sheet inserted.

Keywords: *Food products, *Molasses, Feeding stuffs, Processing, Utilization, Agricultural products, Exports, Pakistan, Developing countries, Developing country application.

Described is the prevailing position of the production and utilization of molasses in Pakistan and the different processes available for the utilization of molasses as animal feedstuffs, food products and chemical products. Each of these processes is described briefly with a flow sheet and the uses of the products enumerated. The selection of production processes is weighed against the present return of foreign exchange through the export of molasses. The products showed either substitute imports or encourage exports having a higher value than molasses and accelerated agricultural output and food production. The optimal distribution among various product groups is discussed with special emphasis upon employing the idle plant capacity of existing distilleries attached to sugar mills and upon expansion of animal feedstuffs industry.

PB80-149529 PC A04/MF A01
Council for Scientific and Industrial Research, Kumasi (Ghana). Building and Road Research Inst.
Building Operations and the Choice of Appropriate Technologies. Interregional Seminar on Building Operations in Low-Cost Housing Construction, Held at Rotterdam (Netherlands), on 5-16 April 1976
Current paper no. 16
J. W. S. de Graft-Johnson. Apr 79, 55p
Prepared in cooperation with Agency for International Development, Washington, DC.

Keywords: *Building materials, *Housing, Construction, Construction materials, Equipment, Manpower, *West Africa, Developing countries, Prefabrication, Developing country application, Low income housing.

Discussed in the report is the selection of appropriate materials, equipment and labor in the construction of low-cost housing in developing countries, especially West Africa. Topics examined include: the development and use of low-cost building materials, tools and simple equipment in building operations, the use of traditional technologies, alternative building methods, industrialization and prefabrication of materials. This paper attempts to identify certain measures which will help others to select building technologies appropriate to their social and economic conditions.

PB80-149776 PC A02/MF A01
New Mexico Energy Inst., Las Cruces.
Selecting Water-Pumping Windmills
Jan 78, 19p

Keywords: Windmills, Well pumps, Design, *Wind energy, *Water pumps, Windpowered pumps.

This short paper is a introductory guide for those considering a windmill for water pumping. Topics discussed include: Parts and Assembly, the tower, the well seal and pump rod assembly, the packerhead, the drop pipe, the cylinder and screen, the discharge pipe, booster mill and storage tanks. Also mentioned are suggestions for windmill size selection and proper site installation.

PB80-151525 PC A05/MF A01
Farmer Cooperative Service, Washington, DC.
Cooperatives Agricoles: Principes de Gestion (Principles of Managing an Agricultural Cooperative)
General rept. no. 120
Milton L. Manuel. Jun 64, 79p
Text in French.

Keywords: *Agricultural cooperatives, Management, Organization theory, Organizations, Rural areas, Farm management, Cooperation, Agricultural economics, Commerce, Records management, Financial management, Accounting, Budgeting, Auditing, Public relations, Problem solving, Industrial relations, Job analysis, Cooperatives, Organizational development, Developing country application.

The principles of business administration are equally well suited to local agricultural cooperatives. The book shows how to effectively manage a cooperative in a step by step analysis. First the necessity and means of management are explained with special attention paid to the rules of the cooperative, the principle of cooperation, and the principles of management including problem-solving. The concept of 'management' itself is explained and its role and functions in the cooperative outlined. The division of labor in management is delineated into the roles of the members in choosing and regulating the administration, the administrative council's functions, and the tasks of the appointed personnel. The separation of responsibilities is stressed. Final chapters are devoted to management instruments and techniques such as accounting, external audit of accounts, and budget preparation; and domains of management including financial management, human relations and evaluation. A detailed questionnaire for the evaluation of a cooperative's management is presented as an annex.

PB80-151723 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Further Research on Road Accident Rates in Developing Countries (Second Report)
G. D. Jacobs, and Wendy A. Hards. c1978, 17p Rept no. TRRL-SUPPLEMENTARY-434

Keywords: Motor vehicle accidents, Developing countries, Statistical analysis, Casualties, Highway transportation, Research, *Roads, *Transportation management, Accident severity, Accident research.

In developing countries in 1974, the authors estimate that there were over 100,000 people killed and 1,500,000 injured in road accidents. However the situation in developing countries, unlike that in Western Europe and North America, appears to be worsening. Until 1972, very little research had been carried out on the problem of road accidents in developing countries but in 1972, following requests for aid and guidance in this field, a small team was formed within the TRRL Overseas Unit. Over the last five years much of the emphasis of the work of this team has been directed towards the collection and analysis of road accident data so that the nature of the problem could be identified. Much of this work has already been published, and in 1975 a paper on this subject was presented at the Summer Annual Meeting of the PTRC. Since publication of the above reports and papers, further research has been carried out on road accident rates and trends in developing countries which illustrates the growing seriousness of the problem. This work is described in the report.

PB80-152911 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Production of Cotton Cloth
Background paper
J. Pickett, and R. Robson. 28 Sep 78, 32p
Report of Working Group No. 3, Appropriate Technology for the Production of Textiles.

Keywords: *Clothing, Textiles, Cotton fabrics, Production, Africa, Exports, Developing countries, *Textile industry, Yarns, Machinery, Developing countries, Developing country application.

The paper is organized in three parts. The first considers briefly world production and trade in textiles and textile machinery; the second gives some details of the structure and character of textile production; and the third provides the results of economic evaluation and draws policy conclusions from these. Particular emphasis is placed on African conditions.

PB80-153125 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for the Chemical Industry
Background paper
J. Giral B. 11 Oct 78, 92p
Report of Working Group No. 1, Appropriate Technology for Heavy Industries. Sponsored in part by Agency for International Development, Washington, DC.

Keywords: *Chemical industry, Technology, Planning, Development, Developing countries, Mexico, Developing country application.

Since 1968 the Group for Development of Technology (Graduate School of Chemical Engineering, National University, Mexico) under my direction has been doing research on Appropriate Chemical Technology for Mexico. During the past 4 years a methodology has evolved that has been published in several papers and handbooks (attached, in the Appendix, is the most recent one). Work has also been done in applying this methodology to micro and macro planning of the Mexican chemical industry, developing quantitative models analyzing the period 1977-1982 in terms of technological requirements as well as financial and human resources, all categorized according to relevant breakdowns.

PB80-153133 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in Developing the Pulp and Paper Industry in Panama
Background paper
M. C. Filippi. 11 Oct 78, 80p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Paper, *Pulp, Paper industry, Pulp mills, Technology, Development, Paper products, Raw materials, Panama, Developing countries, Developing country application.

The development of the pulp and paper industry, in Panama, is considered in two steps: (1) Substitution of import, or medium term development and (2) export or long term development. These two-step developments contemplate the use of non-traditional raw materials and the necessity of new technologies or adaptation of normal technologies to the specific conditions of Panama, in other words the introduction of appropriate technology.

PB80-153141 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Basic Materials Industries: Aspects of Technology Choice and Industrial Location
Background paper
K. H. Yap. 28 Sep 78, 31p
Report of Working Group No. 1, Appropriate Technology for Heavy Industries.

Keywords: *Industrial development, Industries, Processing, Raw materials, Natural resources, Technology, Developing countries, Plant location, Developing country application.

Consideration is given to the interaction of technology-choice with the locational pattern of basic materials industries. In the first place, it concerns the choice of a primary technology stream among a number of interactive technological patterns; subsequently, the development of an optimal technological structure within a particular section is described; then, the choice of plant level amongst alternative technological options is considered. Reference is made to various sectors of current interest in advancing technological progress in developing countries in the context of a broadbased industrialization and balanced socio-economic development approach.

PB80-153158 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Paper, Cardboard, Corrugated Cardboard, Polyethylene Shrink and Stretch Film for Better Packaging
Background paper
S. Mulitsh di Palmenberg. 28 Sep 78, 61p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Paper, *Containers, Manufacturing, Paper products, *Packaging, Pulps, Paperboards, Paper industry, Polyethylene, Production capacity, Packaging materials, Industrial plants, Developing country application.

Included for discussion in this report are: the fundamental importance of packaging in a modern economy; the decisive role of supermarkets in the modification of packaging systems; the necessity for provisional planning by companies using packages; use of different packaging material in relation to technical and economic factors; the global concept of packaging; using paper, cardboard, corrugated cardboard, polyethylene shrink film and polyethylene stretch film in packaging; dimensions and production capacity of industrial plants for the production of 'basic raw materials' for packaging, with special reference to paper, cardboard, corrugated cardboard, and polyethylene film; dimensions and production capacity of industrial plants for the production of paper, cardboard, corrugated cardboard and polyethylene shrink and stretch film packaging; and packaging problems concerning some sections of agriculture and industry.

PB80-153369 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Petrochemical Industry
Background paper.
28 Sep 78, 27p
Report of Working Group No. 1, Appropriate Technology for Heavy Industries.

Keywords: Industrial plants, *Fertilizers, Rural areas, Refineries, Technology, Developing country application, Petrochemical industry, Appropriate technology.

This paper examines possibilities of dispersed end product production fertilizer plants using intermediates or product from local 'Jumbo' plants or from imports. Such dispersion will promote the participation of rural populations and in making available timely inputs for agriculture.

PB80-154040 PC A21/MF A01
Denver Research Inst., CO.
Appropriate Technology for Development: A Discussion and Case Histories
Donald D. Evans, and Laurie Nogg Adler. 1979, 493p* Rept no. ISBN-0-89158-750-0
Contract AID-DSAN-C-0062
Library of Congress Catalog card no. 79-5154.

Keywords: *Industrial development, *Technology transfer, Developing countries, Technology innovation, Economic development, Industries, Financing, Rural areas, *Regional planning, Developing country application.

The analysis of appropriate technology first explores the concept of development in terms of needs, characteristics, and theories and then examines the pivotal role of technology in the developmental process. The twenty contemporary case histories illustrate specific instances of applied technology, not necessarily as examples of successful application, but as subjects for critical review. They are followed by an analysis of the cases and an extensive annotated bibliography.

PB80-154222 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Pulping Technology and Requirements and Potentialities of Developing Countries
Background paper
Gunnar Gavelin. 27 Sep 78, 61p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Pulp, *Paper, Paper products, Pulps, Manufacturing, Technology, Requirements, Pulping, Raw materials, Paper industry, Developing country application.

A given paper product can be manufactured from many different pulp grades, used alone or in blends, with or without addition of fillers and chemicals. In addition, many pulp grades can be made from widely different species of trees or plants. The wide choice of technology thus offered is materially narrowed down by the limitations imposed by local conditions and especially by those prevailing in developing countries. When a choice must be made it helps to know a little about the processes available and be able to assess the applicability of each such process to the end product considered, the raw material available, the size of production desirable and the geographic and economical conditions at the site under consideration. It is the purpose of this document to provide such information.

PB80-154230 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Establishment of Small-Scale Rural Workshops (For Light Engineering Goods) in East Africa
Background paper
A. Hojbak. 6 Oct 78, 50p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.

Keywords: *Industrial development, *Small businesses, Rural areas, *Africa, Technology, Metal working, Fisheries, Technology transfer, *Tanzania, Developing country application, Villages.

The paper deals with the conditions in the 'informal sector' primarily exemplified by present conditions in the East African region. It concentrates on three case studies which are typically 'good' projects seen from an overall point of view. Those projects are: the UTUNDU program - a program specifically designed to promote the village blacksmiths of Tanzania who are representing a strategic productive force in the Tanzanian development program; the fishery program - a soft technology solution to an integrated small scale fishery set-up for tropical coastal societies; and the sister industries agreement - a program whereby know-how, technology, management etc. from an industry in an industrialized country is transferred to a similar industry in a developing country through a special agreement.

PB80-154248 PC A07/MF A01
New Zealand Energy Research and Development Committee, Auckland.
The Potential of Energy Farming for Transport Fuels in New Zealand. Report No. 46
G. S. Harris, M. L. Leamy, T. Fraser, J. B. Dent, and W. A. N. Brown. Aug 79, 130p
Prepared in cooperation with Department of Scientific and Industrial Research, New Zealand. Soil Bureau, Forest Research Institute, Lincoln Coll., Canterbury Univ., Christchurch (New Zealand), and Waikato Univ., Hamilton (New Zealand).

Keywords: *Methane, *Bioconversion, Biomass, *New Zealand, Fuels, Farm crops, Forestry, Design, Substitutes, Methyl alcohol, *Ethanol, Economic analysis, Environmental surveys, Scenarios, Forecasting, Synthetic fuels, Biomass plantations, Developing country application, Manufactured gas.

This report shows how energy farming could provide New Zealand substantial quantities of transport fuels from an available and renewable indigenous energy source. The report studies the main technical and economic aspects of energy farming and propounds a set of guidelines along which it is believed energy farming should or could be developed. It draws attention to environmental and social factors associated with energy farming implementation and points the way to the research, development, and demonstration required before energy farming can be successfully implemented on a significant scale.

PB80-154255 PC A07/MF A01
New Zealand Energy Research and Development Committee, Auckland.
The Potential of Energy Farming for Transport Fuels in New Zealand. Report No. 46. Appendices
G. S. Harris, M. L. Leamy, T. Fraser, J. B. Dent, and W. A. N. Brown. Aug 79, 134p
Prepared in cooperation with Department of Scientific and Industrial Research, New Zealand. Soil Bureau, Forest Research Institute, Lincoln Coll., Canterbury Univ., Christchurch (New Zealand). Dept. of Chemical Engineering, and Waikato Univ., Hamilton (New Zealand).

Keywords: *Methane, *Bioconversion, Biomass, *New Zealand, Fuels, Farm crops, Forestry, Design, Substitutes, Methyl alcohol, *Ethanol, Economic analysis, Environmental surveys, Scenarios, Forecasting, Toxicity, Foreign technology, Synthetic fuels, Biomass plantations, Developing country application, Manufactured gas.

This second volume contains appendices to the study in volume one which shows how energy farming could be used to enable New Zealand to have substantial quantities of transport fuels from an available and renewable indigenous energy source. The report sets out the main technical and economic aspects of energy farming and propounds a set of guidelines along which it is believed energy farming should or could be developed. It draws attention to environmental and social factors associated with implementation and points the way to the research, development, and demonstration required before energy farming can be successfully implemented on a significant scale. The appendices included are: The Suitability and Distribution of Land for the Production of Biomass; Forestry; Agricultural Crops; Maize Grain Production in the Waikato; Processing Routes for Transport Fuels; Advisory Panel Research in the Waikato; Scenarios for Transport Fuels to 2000; Toxicity and other Potential Danger Considerations Associated with Distribution, and Opportunity Costs.

PB80-154263 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Universal Pulping
Background paper
E. S. Prior. 5 Oct 78, 24p
Report of Working Group No. 10, Appropriate Technology for the Manufacture of Pulp and Paper Products.

Keywords: *Pulp, *Paper, Pulping, Processes, Paperboard, Manufacturing, Mills, Paper products, Developing country application.

A pulping process is described which is intended to fit the needs of an independent producer of board in an area of limited wood supplies operated in conjunction with a waste paper mill. The process system is designed around a small, simple, low cost installation, very fast and flexible to be operated with average expertise and producing low pollution levels capable of using all practical sources of fibrous material to produce paper making fiber.

PB80-154271 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Dualism and Technological Harmony for Balanced Development
Background paper
G. K. Boon. 5 Oct 78, 72p
Report of Working Group No. 3, Appropriate Technology for the Production of Textiles.

Keywords: Technology, Investigations, Industries, Development, Developing countries, *Textile industry, Developing country application, *Industrial development, Technology utilization.

The paper explores the possibility of a two-tier industrial development pattern in the Third World and the role technology should play in it. Such a development is aimed at reducing the dualism of these societies and therewith to improve the fate of the vast majority of the population living outside the modern sector. Somewhat more in particular the possibilities of a semi-urban industrialization in textiles is explored.

PB80-154289 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Textile Industries
Background paper
H. W. Sabhaney. 27 Sep 78, 63p
Report of Working Group No. 3, Appropriate Technology for the Production of Textiles. Sponsored in part by Agency for International Development, Washington, DC.

Keywords: *Textile industry, Technology, India, Developing countries, Comparison, Weaving, Textile processes, Policies, Developing country application.

The topics included in the report are: world textile capacity; the Indian textile industry; problems common to developing countries; comparison of processes(spinning, weaving, and textile mill); case study for transfer of appropriate technology; decentralized sector of the textile industry-case study India; trends in the international textile industry; and an outline of industrial policy for developing countries.

PB80-154297 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology for Production and Processing of Oils and Fats
Background paper
K. T. Achaya. 2 Oct 78, 14p
Report of Working Group No. 9, Appropriate Technology for the Production of Oils and Fats.

Keywords: Food processing, *Vegetable oils, Processing, Technology, Facilities, Refineries, Marketing, Production, Cost engineering, Developing country application, Villages, Cooperatives.

In practice, the country's needs of vegetable oil can be met through decentralized rural ghani units, backed up with solvent-extraction units for recovery of the oil left in the cake. Expeller technology represents an intermediate stage with less employment-generating potential. Grouping village crushing units into cooperatives will enable the latter to keep oil prices under control. Such cooperatives could also build up facilities for refining oils and preparing oil-based products, and for marketing these commodities. There appears to be scope for marketing unit-packed unrefined oils, and for exploring the use of vending machines for dispensing liquid oils and thus saving on packaging costs.

PB80-154362 PC A08/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Anatomy of a Peasant Economy: A Rice Village in the Philippines
Yujiro Hayami, Massao Kikuchi, P. F. Moya, L. M. Bambo, and E. B. Marciano. 1978, 161p AID-PN-AAG-562

Keywords: *Rice, Technology innovation, Economic impact, *Philippines, Rural areas, Social change, Income, Employment, Economic analysis, Assets, Land titles, Investments, *Agricultural economics, Labor estimates, Rural development, Developing country application.

The influences of improved rice-growing technology in effecting economic and social changes in rural Philippines villages is assessed. The report analyzes the impact of new rice technology on various facets of life such as employment and income distribution. The flow of income from rice farming and other enterprises among classes of village households is monitored. Many photographic illustrations and tables are included as well as a liberal list of reference works.

PB80-154370 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Sulfur Nutrition of Wetland Rice
Research paper series
G. J. Blair, C. P. Mamaril, and E. Momuat. Nov 78, 32p IRPS-21, AID-PN-AAG-565

Keywords: *Rice, Rice plants, Plant nutrition, *Fertilizers, Sulfur organic compounds, Adsorption, Soil water, Sulfates, Requirements, Plant growth, Soil analysis, Grain crops, Yield, Developing country application.

This report concludes that increased yields of rice being enjoyed through the use of fertilizers containing little or no sulfur, has led to sulfur deficiency in rice. It cites the lack of study in the cycling of sulfur through the rice plant. Discussed in the report is a general outline of sulfur cycle from the viewpoint of soil transformations and plant requirements.

PB80-154368 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Tropical Climate and Its Influence on Rice
Research paper series
Shouichi Yoshida. Jul 78, 28p IRPS-20, AID-PN-AAG-711
Grant AID/ta-G-1074-GTS

Keywords: *Rice, Climate, Rice plants, Tropical regions, Solar radiation, Plant growth, Atmospheric temperature, Rainfall, Yield, Developing country application.

Major climatic factors are discussed in relation to their influence on crop period, productivity, and stability. Most places in monsoonal Asia receive about 300 cal/sq cm per day during the ripening period of the wet season rice crop. With the right variety and proper management, this level of solar radiation should allow rice crops to produce 4 to 5 t/ha. Advantages and disadvantages of altering plant height and growth duration are described. For direct-seeded rice, the shortest

growth duration, without much sacrifice in yield potential, is about 90 days; for transplanted rice, it is about 100 days.

PB80-154396 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Genetic Interrelationships of Improved Rice Varieties in Asia
Research paper series
T. R. Hargrove, W. R. Coffman, and V. L. Cabanilla. Jan 79, 38p IRPS-23, AID-PN-AAG-564

Keywords: *Rice, Rice plants, Plant genetics, Developing countries, Height, Plant diseases, Improvement, *Asia, Developing country application.

The study of genetic interrelationships of rice varieties in Asia as a part of better understanding crop-destructive insect and disease epidemics of the past is presented. The report shows the genetic diversity of improved rice varieties released in Asia, by analyzing selected crosses made in seven Asian countries. Over a ten-year period, the percentage of semidwarf parents used in the total gene pool nearly doubled because breeders were increasing crosses of semidwarf parents with other semidwarf varieties. Taichung Native I and IR8 were the most extensively used gene sources in 1965-67 but found to drop off to nearly zero in the next ten years. The study shows the use of other International Rice Research Institute semidwarfs increased significantly but the strongest trend was the use of locally developed semidwarf, up from two percent to 49 percent in 1974-75. It is concluded that cytoplasmic similarity of modern varieties, while posing no immediate problem, is sufficiently relevant for prompt broadening of maternal genetic base of modern rices.

PB80-154404 PC A04/MF A01
Wisconsin Univ.-Madison. Center for Resource Policy Studies.
The Economics of Water Reform: Institutional Design for Improved Water Management in the LDC's
Working paper
Daniel W. Bromley, Donald C. Taylor, and Donald E. Parker. Oct 77, 53p WP-8, AID-PN-AAG-544

Keywords: *Irrigation, Water supply, Developing countries, Decision making, Allocations, Management, Availability, Developing country application, *Water management, Irrigation water.

The productivity of irrigated agriculture and the importance of equity in irrigated systems is presented. The report suggests irrigation potentials may be expanded through the construction of new projects; rehabilitation and modification of the infrastructure in existing projects; modification of the operation and maintenance of irrigation infrastructure; and implementation and enforcement of rules and regulations governing the use of irrigation facilities. A range of possibilities for enlarging and making more equitable the use of existing irrigation water supplies is given. The report employs as illustrations projects in which decisions are made to redesign the infrastructure so as to serve most directly land owned by more powerful irrigators.

PB80-154420 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Methods of Screening Rices for Varietal Resistance to 'Cercospora' Leaf Spot
Research paper series
B. A. Estrada, and S. H. Ou. 1978, 12p IRPS-19, AID-PN-AAG-710

Keywords: *Rice, Plant diseases, Rice plants, Fungus diseases, Spores, Inoculation, Tolerances(Physiology), Selection, Developing country application.

Autoclaved rice stem nodes with prune juice provide a favorable medium for the isolation of Cercospora Oryzae, the fungus causing Cercospora leaf spot on narrow brown leaf spot, and for the mass production of spores. Spraying of spores in late afternoon resulted in good infection on plants in the field. As shown by artificial inoculation, rice at different stages of growth is susceptible to C. oryzae. An incubation period of 20 days is necessary before the first few lesions appear and 30 days before the maximum number of lesions is reached. A method of artificial inoculation for screening varieties for resistance and a disease scale of 0 to 9 units, based upon the number of lesions, are suggested.

PB80-154453 PC A03/MF A01
Rhode Island Univ., Kingston. International Center for Marine Resource Development.
An Investigation Into the Microbiological Quality of Fish in Guatemala and Costa Rica
Working paper
Luis F. Arias, Gonzalo Bonilla, C. O. Chichester, S. M. Constantinides, and Sheryl de Cabrera. Jan 78, 39p ICMRD/WP-3, AID-PN-AAG-781

Keywords: *Microbiology, *Fishes, *Guatemala, *Costa Rica, Bacteria, Surveys, Microorganisms, Quality, Contamination, Coliform bacteria, Staphylococcus, Seafood, Potable water, Ice, Regulations, Materials handling, Distribution(Property), Developing country application, Drinking water.

Two preliminary surveys were made on the quality of fish caught by artisan fishers in Costa Rica and Guatemala. The presence of microbiological contamination was tested from point of catch to sale in Costa Rica, and in various retail markets in Guatemala. Observations were made on sanitary conditions in the marketplaces of both countries. Findings from the Costa Rican study indicate abnormally high counts of bacteria, coliform, and staphylococcus. Since both coliforms and staphylococci are not part of the normal flora of raw seafood, their presence is considered an indication of contamination from human sources. Conclusions made on the results of the two studies: (1) more potable water is needed for washing boats, containers, utensils, and all surfaces that come in contact with fish or ice; (2) ice should be of good quality and should not be reused; (3) pressure on caught fish should be reduced by use of flake ice; and (4) regulations regarding the handling and distribution of fish and other perishable commodities should be more strongly enforced. Separate references for each study are listed on pages 11 and 20.

PB80-154628 PC A12/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Technologies from Developing Countries (A Preliminary Compilation)
Background paper.
6 Oct 78, 260p
Report of Working Group Nos. 1-12.

Keywords: *Technology transfer, *Textile industry, *Paper, *Pulp, Technology, Developing countries, Chemical industry, Metal working, *Drugs, Textiles, Construction materials, *Food processing, *Agricultural machinery, Paper products, Pulp mills, Developing country application.

The document compiles information on technologies which have been developed in certain sectors in developing countries and which can be acquired from sources in these countries. The sectors selected for this compilation are: chemicals and metalworking; drugs and pharmaceuticals; textiles; cement and building materials; food storage and processing; agricultural machinery and implements; light engineering and rural workshops; oils and fats; paper products and small pulp mills; energy for rural requirements; and low-cost transport for rural areas. Each technology is presented on a separate page providing information on the following items: title of the product/process; short description and advantages of the product/process; technical and economic details (with diagram/photos, if available); status of commercialization; and contact address for further information. Only those products or processes have been included that are available for introduction on a commmercial scale.

PB80-154651 PC A03/MF A01
Agency for International Development, Washington, DC.
The Buffalo as a Draft Animal in Thailand
Jean K. Garner. Oct 79, 36p

Keywords: *Animal energy, Livestock, Developing countries, *Thailand, Hauling, Cost analysis, Questionnaires, Tropical regions, Efficiency, Developing country application, Buffaloes, Harness.

The greater efficiency of an improved harness for buffalo as draft animals is explained and demonstrated with pictures and with load and endurance tests. The improved harness can be made with local materials in tropical regions. A questionnaire on buffalo production and use is included.

PB80-154677 PC A05/MF A01
Instituto Nacional de Vivienda y Urbanismo, San Jose (Costa Rica).
Manual Practico para la Construccion de Casas de Bloques (Practical Manual for House Construction Blocks)
Manuel Moas M, and Luis Rodriguez E. 1974, 78p
Text in Spanish.

Keywords: *Concrete, *Houses, Construction, Concrete structures, Construction materials, Concrete blocks, Manuals, Developing country application.

This manual presents in three sections a good explanation of (1) construction materials (2) measurements and tools, and (3) the actual construction and techniques for concrete houses. It deals only with construction where cement is used and is designed for self-help programs.

PB80-154685 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Planning of Rural Energy Systems: Issues and Perspective
Background paper
Jyoti K. Parikh. 6 Oct 78, 71p
Report of Working Group No. 11, Appropriate Technology for Rural Energy.

Keywords: Rural areas, Energy, Technology transfer, Planning, Production, Fossil fuels, Wood, Solar heating, Electric power generation, *Energy source development, Developing country application, Energy consumption, Energy demand, Energy supplies.

The present paper identifies the difficulties in the present pattern of rural energy consumption which is largely based on non-commercial fuels, supply of which is unplanned and sufficient only for the subsistance level activities. It reflects on future energy demand till 2000 A.D. under the high rural development scenerio showing that increase in non-agricultural activities should be foreseen and that intensification of agriculture will also require increased energy inputs. Techno-economic considerations for rural energy supply options and in particular those based on concepts of decentralized systems are discussed, although they are not advocated if found to be more expensive than centralized systems. The need for looking into problems of technology transfer in the rural environment, establishing organizational framework for construction and maintenance and standardization procedures are emphasized.

PB80-154701 PC A11/MF A01
Colegio de Ingenieros Electricistas, Mecanicos e Industriales de Costa Rica.
Memoria del Primer Seminario Nacional de Energia (Memoir of the First Seminar on Energy)
1978, 250p
Text in Spanish.

Keywords: *Wind energy, *Bioconversion, Energy, Meetings, *Solar energy, Biomass, Developing country application, Wind power, *Hydroelectric power.

This report is a collection of papers presented at a seminar on energy held in Costa Rica. The studies concentrate on the countries of Central America. Conclusions and recommendations are given for solar, wind, and biomass energy. Hydraulic resources in Costa Rica are studied in detail. Statistics, maps, charts, photos, and graphics are included.

PB80-154727 PC A04/MF A01
Instituto Nacional de Vivienda y Urbanismo, San Jose (Costa Rica).
Manual de Sanidad en la Vivienda Rural (Health Manual for Rural Housing)
Luis Rodriguez E. 1975, 55p
Text in Spanish.

Keywords: *Health, *Houses, Rural areas, Manuals, Climate, Ventilation, Light(Visible radiation), Garbage disposal, Accident prevention, Disease vectors, Potable water, Toilet facilities, Wells, Developing country application, Housing, Health manpower, Drinking water.

This manual is intended for the people, the local authorities, and health personnel of rural areas. Emphasis is given to the main principles of hygenic measures in rural areas and farms for the benefit of the people. The themes explained: climate, ventilation, light, garbage disposal, protection against accidents, animals and insects that transmit diseases, drinking water, toilets, and wells. Many illustrations are included for information.

PB80-154982 PC **A11**/MF **A01**
International Rice Research Inst., Los Banos, Laguna (Philippines). Agricultural Engineering Dept.
The Technical and Economic Characteristics of Rice Postproduction Systems in the Bicol River Basin
Apr 78, 232p AID-PN-AAG-561
Prepared in cooperation with University of the Philippines at Los Banos. Process Engineering Dept.

Keywords: *Rice, Rice plants, Production, Philippines, Harvesting, Losses, Food processing, Profits, Agricultural economics, Drying, Investments, Operating costs, Cost estimates, Manpower, Expenses, Bicol River Basin, Developing country application.

Problems in grain losses during rice production processes, as practiced in the Bicol River Basin Region of the Philippines, is examined. The focus is largely on technical aspects of post-production operations including the interdependencies that exist between components of each system. An attempt is made to examine the economic and institutional factors that condition the selection of particular technology patterns. It is assumed that grain losses are unnecessarily high and prescribes the introduction of improved management techniques and technology.

PB80-154990 PC **A05**/MF **A01**
Rhoda (Richard E.) Arlington, VA.
Development Activities and Rural-Urban Migration: Is It Possible to Keep Them Down on the Farm
Richard E. Rhoda. Mar 79, 88p AID-PN-AGG-673
Contract AID/otr-147-79-25

Keywords: *Socioeconomic status, Population migrations, Rural areas, Urban areas, Sociology, Agriculture, Farms, Social services, *Employment, Development, Developing countries, Developing country application, Agricultural extension services.

A review of rural-urban migration literature is provided in this report. Nine different development activities in rural areas, as well as international agency development projects and their impacts on such migration are presented. The report contains discussions of migration literature such as theoretical models and empirical studies; agricultural development activities including land reform, green revolution, agricultural mechanization, agricultural services; off-farm employment; development of rural social services; development projects of international agencies; and conclusions and implications for development activities, project assessment and analysis, and future research. Tables summarizing implications of empirical studies and specific development activities for rural-urban migration are included. A bibliography containing over 100 references is provided.

PB80-155005 PC **A10**/MF **A01**
Florida Univ., Gainesville. Dept. of Animal Science.
Latin American Symposium on Mineral Nutrition Research with Grazing Ruminants
Joe H. Conrad, and Lee R. McDowell. 1978, 204p AID-PN-AAG-611
Proceedings of Conference, Held at Belo Horizonte, Brazil, on March 22-26, 1976. Prepared in cooperation with Agency for International Development, Washington, DC.

Keywords: Latin America, Meetings, Mineral deficiencies, Toxicology, *Soils, Toxicity, Research, Ruminants, Productivity, Concentration(Composition), *Plants(Botany), Nutritional requirements, Developing country application.

Included in the report are 27 reports on basic knowledge, methodology, and recent findings relating to mineral deficiencies and toxicities in Latin America. The papers summarize current information about the mineral elements which influence productivity of grazing ruminants in tropical areas. Low productivity, as judged by the meat and milk yield per animal, accounts for the limited supplies of animal protein in LDCs. A wide variety of research topics discuss improving productivity in grazing ruminants. Among these topics are (1) soil mineral concentrations and properties, (2) individual mineral characteristics, (3) soil-plant-animal mineral relationships, (4) techniques of minerals research, (5) current status of locating regions of mineral deficiencies and toxicities, (6) the determination of nutrient requirements of ruminants in the tropics, (7) diagnosis of diseases caused by mineral deficiencies, and (8) methods of mineral supplement formulation and administration for grazing ruminants. Many of the reports display research findings in tables and figures. Included are photographs illustrating mineral deficiencies and toxicities in grazing ruminants.

PB80-155013 PC **A05**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
The Nutritional Situation in Sierra Leone. Report No. 1, Project on Consumption Effects of Economic Policy
Kathryn M. Kolasa. Oct 78, 100p AID-PN-AAG-612
Contract AID/DSAN-C-0008

Keywords: *Food services, *Health, *Diseases, *Africa, Nutrition, Behavior, Food, Nutritional deficiency diseases, Statistical data, Children, Pregnancy, Females, Health status, Developing country application, *Sierra Leone, Women.

Information and data compiled after 1974 on the nutritional status and food behavior of citizens in Sierra Leone, Western Africa are presented. The concentration is mainly on children under five with some data on pregnant and lactating women, owing to the fact that these groups are most likely receiving formal medical assistance. The study relies on available data with some direct observations made by the research team. It is concluded that malnutrition in children under five represents a major nutritional problem, with about 30 per cent of children found to be underweight. The nutritional status of children under five appears to have changed little since 1964. It is believed that pregnant women in Sierra Leone are under nutritional peril, although it is not clear whether availability of food, taboos, or other reasons affect the food intake of these women. A lack of calories represents the primary nutritional problem among working adults. The report provides a wide selection of interviews, professional opinions, papers, and Sierra Leone National Nutrition Survey Questionnaire, as well as extensive lists of figures and tables.

PB80-155021 PC **A03**/MF **A01**
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.
Sociocultural Aspects of Technological and Institutional Change Among Small-Scale Fishermen
Richard B. Pollnac. Mar 78, 33p ANTHROPOLOGY/WP-22, AID-PN-AAG-602
Contract AID/csd-2455

Keywords: Technology innovation, *Social change, *Fisheries, Industrial sociology, Fishing, Social psychology, Developing countries, Social anthropology, Social organization, Manpower utilization, Culture(Social sciences), Economic impact, Fishing industry, Developing country application.

The interrelationships between technology and institutional change and several important aspects of human social adaptation to small-scale fishing are presented. The report also includes examples of how technological and institutional changes impact on social relationships; suggestions concerning the utility of the model for development programs; and a diagram illustrating the relationships between technology and social organization. A bibliographical reference of 50 names is included.

PB80-155039 PC **A04**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
An Economic Evaluation of Apprenticeship Training in Western Nigerian Small-Scale Industries
African rural economy paper
Adewale F. Mabawonku. 1979, 75p AREP-17, AID-PN-AAG-616
Contract AID/ta-C-2

Keywords: *Training, Apprenticeship, *Nigeria, Industrial training, Specialized training, Benefit cost analysis, *Employment, Cost estimates, Socioeconomic status, Demography, Return on investments, Entrepreneurship, Developing country application.

An analysis is given of the structure, conduct, and performance of the apprenticeship system in Nigeria, Africa. The focus is on the apprenticeship system as an institution for acquiring skills. An assessment of the economics of apprenticeship training by comparing returns from apprenticeship and trade school training is provided with recommendations for policies to train small entrepreneurs, who are considered desirable in Nigeria. Findings of the study show that the apprenticeship system provides other sectors of the economy with skilled workers in addition to training new entrepreneurs. It suggests that training under the apprenticeship system be incorporated into national manpower policies and that the upgrading of small proprietors who train apprentices will benefit all industry. Proprietors who provide training for apprentices often subsidize apprentices and suffer a loss of earnings and, in effect, are transferring their income to other sectors of the economy. Many tables are included providing statistical information.

PB80-155054 PC **A07**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Income Distribution Among Farmers in Northern Nigeria: Empirical Results and Policy Implications
Agrican rural economy paper
Peter J. Matlon. 1979, 130p AREP-18, AID-PN-AAG-617
Contract AID/ta-C-1328

Keywords: Income, *Nigeria, Farm management, *Agricultural economics, Earnings, Demography, Households, Land use, Climate, Soils, Farmers, Ownership, Developing country application.

Despite the Nigerian government objective of achieving a more equal distribution of gains from economic growth, the income gap between rich and poor in that African nation has widened substantially. The report studies income distribution among farmers in Northern Nigeria and concludes that achieving goals have been hindered by insufficient knowledge about designing appropriate policies, implementing them, and measuring their impact. The difficulty in designing policy instruments which effectively reach more than a small proportion of the rural poor is examined. The report describes the need for policies which make farming more profitable, pointing up the importance of improved food grain technologies since most poor farmers themselves are net grain purchasers. The need for further study to explain farm productivity differentials with income classes is cited. Factors which could provide valuable guidance in designing improved technologies appropriate to low-income producters is cited. An extensive bibliography and some illustrations are included.

PB80-155302 PC **A05**/MF **A01**
Instituto Centroamericano de Investigacion y Tecnologia Industrial, Guatemala City.
Caracterizacion, Manejo y Almacenamiento de Aguacate (The Avocado: Characteristics, Handling, and Storage)
M. C. de Arriola, J. F. Monchu, and C. Rolz. 1976, 81p Rept no. ICAITI-76-101
Text in Spanish.

Keywords: *Fruits, Food storage, Fruit crops, Tropical regions, History, Chemical reactions, Maturation, Vitamins, Harvesting, Nutritive value, Guatemala, Developing country application, Avocados.

Information is given on the avocado fruit: history, physical and chemical changes during the maturation process, different types and content of oil, sugars and vitamins. Special research to determine the best period for the harvest was accomplished using the 'Collin red' variety. A reference bibliography is included (some in English, French, and Spanish).

PB80-155344 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Some Manual Methods of Screening Aggregates for Labour-Intensive Road Construction
R. Robinson. c1979, 17p Rept no. TRRL-SUPPLEMENTARY-503

Keywords: *Roads, Construction materials, *Aggregates(Materials), Size screening, Size screens, Size separation, Developing countries, *Ethiopia, *Malawi.

Methods of manual screening of aggregate which have been used in Ethiopia and Malawi are described. The first method uses static screens through which the aggregate is thrown and the second method uses screens which are shaken up and down to help sift the aggregate. In the third method, the aggregate is raked and washed through static screens. Manual screening has proved to be an effective and economic way of producing aggregate when only limited quantities are required. (Copyright (c) Crown Copyright 1979.)

PB80-155377 PC A23/MF A01
California Univ., Davis. Water Resources Center.
Residential Water Re-Use
Technical completion rept.
Murray Milne. Sep 79, 550p* 46, W80-03640
Prepared in cooperation with California Univ., Los Angeles. School of Architecture and Urban Planning.

Keywords: *Waste water reuse, *Water supply, Water conservation, History, Design, Water wells, Pumps, Construction, Residential buildings, Public health, Feasibility, Irrigation, Pipes, Storage tanks, Water storage, Manufacturers, Bibliographies, Reclaimed water, Domestic water.

Greywater, rainwater, groundwater, and surface water are sources of 'free' water already available to every homeowner on-site. This book explains the various ways to collect, store, treat, and distribute this water, and gives examples of how it has been successfully reused for toilet flushing, landscape irrigation, washing, bathing, or drinking. For many of these functions water can be reused directly without treatment. The argument in favor of water reuse is given along with a brief history of residential water reuse, how rainwater and groundwater can be developed as an on-site supply, the uses of greywater for garden irrigation, various residential-scale systems that have been designed for on-site reuse, and an explanation of the components needed to build such systems. The appendix contains a directory of manufacturers, a glossary of specialized terms, units of measure, and an annotated bibliography containing over 500 citations.

PB80-155450 PC A04/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Sisal Fibre Concrete for Roofing Sheets and Other Purposes
Background paper
Hakan Persson, and Ake Skarendahl. 26 Sep 78, 64p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials.

Keywords: *Building materials, *Concrete, Developing countries, Roofs, *Reinforced concrete, Production, Quality, Tensile strength, Deformation, Crack propagation, Durability, Fire safety, Developing country application.

When building in rural areas in developing countries, roofing normally is the major difficulty. Concrete reinforced with sisal fibres is shown to have properties suitable for the production of thin sheets, e.g. for roofing. The production of sisal fibre concrete can be carried out manually by local craftsmen but can also be mechanized in different steps in order to increase the production rate and the quality. The fibre reinforcement gives the concrete higher tensile strength, higher deformation capacity and an improved crack distribution. If properly done, sisal fibre concrete has also all potentially good qualities of normal concrete, e.g. fire resistance, water tightness, durability, ease of production, low price. Sisal fibre concrete is also a low-energy consuming material. The products can be used in traditional as well as in more advanced building techniques.

PB80-156250 PC A07/MF A01
Centro de Comunicacion Popular, Panama City.
Las Cooperativas Agropecuarias Como Instrumento de Cambio Social (Farming Cooperatives as Tools for Social Change)
Marcelino Atencio. 1979, 140p
Text in Spanish.

Keywords: Agricultural products, Sales, Cooperation, Interviewing, Statistical data, Social change, *Panama, Developing country application, *Agricultural cooperatives, Cooperatives, Veraguas(Panama).

Evaluation of farming cooperatives in the province of Veraguas in Panama is presented in this report. The research is made by observation and analysis of statistics and interviews from 170 cooperative users. It includes the many advantages that the cooperatives have brought to the inhabitants of the Veraguas region. Topics include: beginning and development of farming cooperatives; farming cooperativos as a tool for social change; and future perspectives of farming cooperatives in Veraguas.

PB80-156288 PC A04/MF A01
Instituto Centroamericano de Investigacion y Tecnologia Industrial, Guatemala City.
Caracterizacion, Manejo y Almacenamiento de Papaya (The Papaya: Characteristics, Handling, and Storage)
M. C. de Arriola, J. F. Menchu, and C. Rolz. 1976, 52
Rept no. ICAITI-76-104
Text in Spanish.

Keywords: *Fruits, Food storage, Maturation, Tropical regions, Temperature, Ascorbic acid, Pepsin, Chemical reactions, Plant diseases, Fumigation, Guatemala, Developing country application, Papayas.

Papaya were studied during maturation at normal temperatures. The results obtained: the pepsins content increased, changes in protopectina and soluble peptina were less noticeable; acid content increased until a maximum and then decreased, the content of sugars increased and also of ascorbic acid, both reaching a maximum when ripe. It was detected that due to its size and delicate skin, the handling of this fruit is difficult. This is also why insects attack the fruit. The most common disease is the antracnosis, caused by some mushrooms. Tests for its storage showed that the fruit can be kept at 12 degrees C for as long as 2 or 3 weeks, followed by a period of 7 to 8 days at normal temperature of 23 degrees C, to reach optimum ripeness.

PB80-157001 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Choice and Adaptation of Appropriate Technology in Promoting Health-Care in Zambia
Background paper
P. K. Goma. 6 Oct 78, 18p
Report of Working Group No. 2, Appropriate Technology for the Manufacture of Drugs and Pharmaceuticals.

Keywords: *Health care delivery, *Zambia, Objectives, Technology, Drugs, Developing countries, Health care, Developing country application.

The purpose of the paper is to look at the health care in Zambia prior to and after independence to determine the countries' goals and to decide what technology can be adapted to achieve these goals. Special reference is given to drugs and pharmaceuticals as well as the future role of the international pharmaceutical community in achieving these goals.

PB80-157035 PC A02/MF A01
Ministerio de Agricultura y Ganaderia, Panama City.
Guia para el Cultivo de Hortalizas (Guide for the Cultivation of Vegetables)
1966, 18p
Text in Spanish.

Keywords: *Vegetables, Vegetable plants, Horticulture, Manuals, Fruit crops, Planting, Plant diseases, Schools, Developing country application.

This report is a guide with illustrations for growing vegetables. It is addressed to teachers who are in charge of projects of this sort in schools. The importance of this activity is analyzed and information is presented on ostablishing school orchards, climate conditions, size of lots, sowing techniques and common diseases of vegetables.

PB80-157043 PC A06/MF A01
Instituto Nacional de Aprendizaje, San Jose (Costa Rica). Dept. Tecnico Docente.
Cultivador de Citricos (Citric Fruit Grower)
1978, 103p
Text in Spanish.

Keywords: *Fruits, Fruit crops, Cultivation, Tropical regions, Manuals, Planting, Fertilizers, Harvesting, Plant reproduction, Hand tools, Food packaging, Developing country application.

This is a practical manual for the growing of citric fruits. The equipment, tools, and materials needed for the work are given. Technical preparations of the seedplots, caring of the orchards, grafting, ingrafting, transplanting, fertilizing, harvesting, classification of the fruit, and packing are explained. The document has many illustrations.

PB80-157092 PC A03/MF A01
Instituto Centroamericano de Investigacion y Tecnologia Industrial, Guatemala City.
Caracterizacion, Manejo y Almacenamiento de Pina (Pineapple: Characteristics, Handling, and Storage)
M. C. de Arriola, J. J. Menchu, and C. Rolz. 1976, 41p Rept no. ICAITI-76-105
Text in Spanish.

Keywords: *Fruits, Food storage, Chemical reactions, Tropical regions, Ascorbic acid, Temperature, Chlorophylls, Harvesting, Cold storage, Guatemala, Developing country application, Pineapples, Anana sativus.

Studies on the physical and chemical changes suffered through the maturation process of the pineapple (anana sativus), show the following results: decrease in weight, ascorbic acid increase, reaching various values according to the types, total acidity increase, and chlorophyl increase. The time of harvest is explained with consideration given to the different varieties of pineapples: Cayena, Monte Lirio, Espanola Roja, and Queen. The temperature for storage and refrigeration are examined.

PB80-157100 PC A04/MF A01
Asociacion Lationamericana de Produccion Animal, Panama City.
Produccion Caprina en Medios Dificiles de America Latina (Goat Raising in Difficult Areas of Latin America)
Carlos Gonzales Stagnaro. 1979, 55p
Text in Spanish.

Keywords: Goats, *Animal husbandry, *Latin America, Meetings, Feeding stuffs, Milk, Meat, Reproduction(Biology), Sanitation, Animal ecology, Developing country application.

This report is a collection of papers presented at a seminar in Panama City. The papers describe raising goats to intensify their use for milk and meat in developing countries. Topics include: Exploitation of goats in Latin America; Ecology in the raising of goats and improvement of feeding these animals; Programs for improvement of sanitary conditions in goat's environments; Meaning of goat herds in socio-economical conditions; Principles and strategies to increase their reproduction.

PB80-157118 PC A03/MF A01
Panama Univ., Panama City. Facultade de Agronomia.
Cultivo de la Soya en Panama - Analisis Y Recommendations Preliminares (Cultivation of Soybeans in Panama: Analysis and Preliminary Recommendations)
Gaspar A. Silvera. 1976, 33p
Text in Spanish.

Keywords: *Soybeans, Cultivation, *Panama, Acclimatization, Fertilizers, Seeds, Plant diseases, Storage,

Droughts, Cost analysis, Developing country application.

In the first part of this report, a summary is given of the importance of the soybean as one of the most nutritious of the leguminous plants; adaptation of this plant in other countries; (Asia is its place of origin); types; fertilization; plagues, diseases, storage, handling of the seed; and estimate of costs of production by hectare. The second part includes the results from the experimental sowing during the dry season of 1976 in Bayano, where the use of nine varieties of soy was tested.

PB80-157126 PC A03/MF A01
Instituto Nacional de Aprendizaje, San Jose (Costa Rica).
Construccion Navy (Ships Construction)
1977, 46p
Text in Spanish.

Keywords: *Boats, *Ships, Shipbuilding, Metal cutting, Ship hulls, Applications of mathematics, Developing countries, Costa Rica, Developing country application.

This report is an illustrated guide for teaching the main steps for the construction of ships. The areas covered include: cutting of metals; parts of a ship; decks; and mathematical principles such as theorems, construction of triangles, and rectangles.

PB80-157191 PC A05/MF A01
Georgia Inst. of Tech., Atlanta. Economic Development Lab.
Regional Forums on Appropriate Technology
Final rept.
Jeffrey S. Tiller, David S. Clifton, Jr, and Robert A. Cassanova. Feb 79, 97p NSF/RA-790380
Grant NSF-ISP78-22994

Keywords: *Technology transfer, Meetings, Requirements, Education, Social services, Problem solving, Resources, Economic analysis, Research projects, Appropriate technology.

The report collates and summarizes the proceedings of seven regional forums on appropriate technology (AT) sponsored by the National Science Foundation. These forums investigated the potential for adoption of appropriate technology, characterized the needs of appropriate technology practitioners and advocates, and determined the role of the National Science Foundation in appropriate technology. Each regional forum is reported with respect to publicity, advisory committee, forum agenda, mechanism for public input, and attendees. The following major critical needs are identified for more widespread adoption of appropriate technologies: (1) education and information dissemination; (2) social science research; (3) determination of economic feasibility; (4) removal of institutional barriers; (5) technical research; (6) marketing and business strategies; and (7) evaluation of holistic technology development.

PB80-157407 PC A08/MF A01
International Islamic Center for Population Studies and Research, Cairo (Egypt).
Socio-Economic Profile of Rural Egypt
Iliya Harik. Mar 79, 169p AID-PN-AAG-593
Prepared in cooperation with Cornell Univ., Ithaca, NY. Rural Development Committee.

Keywords: *Socioeconomic status, Agronomy, Rural areas, *Egypt, Farms, Productivity, Social services, *Agriculture, Sociology, Economics, Developing countries, Developing country application, Cooperatives.

A socio-economic profile of rural Egypt focusing on the impact of agrarian reform programs undertaken in recent years is presented. It suggests that despite mixed results, the record of agrarian reform in Egypt has been upheld and that original objectives have been fulfilled, particularly in areas of land distribution, maintenance, preservation of productivity, secure tenancy for small farmers, credit facilities, political domination, participation in national policy regarding agriculture, and extending social services into rural areas. The report notes that small cultivators have become the mainstay of Egypt's agricultural economy and finds that agricultural mechanization has not undermined the country's household economy but rather sustained it through easy credit terms, land consolidation, and large-scale production adjusted to household systems of cultivation through cooperatives. The study finds continuation of widespread poverty citing national government efforts to reclaim desert lands as a key program in offsetting land shortage.

PB80-157415 PC A05/MF A01
Rhode Island Univ., Kingston. International Center for Marine Resource Development.
Artisan Fishery Technology: Ghana. A Case Study of a West African Fishery
Matthew Cauria, K. Okoso-Amaa, C. O. Chichester, and Tung-Ching Lee. 1979, 83p AID-PN-AAG-674
Prepared in cooperation with Food Research Inst., Accra, Ghana.

Keywords: *Food processing, *Fisheries, *Ghana, Fishing, Food consumption, Quality, Smoking, Food preparation, Food packaging, Drying, Food deterioration, Marketing, Developing country application, Fresh fish.

This report is a case study of fish harvesting, handling, preparation, and marketing techniques, and fish consumption patterns currently existing in Ghana. The intent of this research was to determine the constraints to increased productivity of the Ghana fishing industry which is believed to be representative of the entire West Africa fishing industry.

PB80-157746 PC A05/MF A01
Instituto Centroamericano de Investigacion y Tecnologia Industrial, Guatemala City.
Caracterizacion, Manejo y Almacenamiento de Algunas Frutas Tropicales (Characteristics, Handling, and Storage of Some Tropical Fruits)
M. C. de Arriola, J. F Menchu, and C. Rolz. 1976, 100p Rept no. ICAITI-76-102
Text in Spanish.

Keywords: *Fruits, *Food storage, Tropical regions, Color, Texture, Atmospheric temperature, Chemical reactions, Ascorbic acid, Descriptions, *Central America, Developing country application.

Some tropical fruits, mainly growing in Central America are studied, in order to better understand the physical and chemical changes that occur during their ripening, and the best temperature for storage. Some of the fruits included are: mamey (Mamniea Americana), yellow passion fruit (Passiflora edulis), guayaba (Psidium guajaba), and zapote (Lucumma mammosa), chicozapote (Achras Zapote) and others. Each fruit is also described in English in a concise summary.

PB80-157753 PC A04/MF A01
Ministerio de Agricultura y Ganaderia, Panama City.
Cultivo de Frutales (Fruit Growing)
Luis Montenegro V, and Franklin Becerra. 1972, 63p
Text in Spanish.

Keywords: *Fruits, Fruit crops, Tropical regions, Planting, Soil properties, Insects, Fertilizers, Plant diseases, Developing country application.

The essential techniques for the production of citric fruits (pineapple, maracuya, mango, avocado, papaya, and guayaba) are described. The types and varieties, climate and soil, fertilization, grafting, plagues and diseases, and harvest periods are given for each of these fruits.

PB80-157803 PC A05/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Light Engineering Workshops for Rural Areas
Background paper
Prasanta K. Das. 5 Oct 78, 88p
Report of Working Group No. 8, Appropriate Technology for Light Engineering Industries and Rural Workshops.

Keywords: *Small businesses, *Industrial development, Rural areas, Technology, Industries, Organizations, Meetings, Engineering, Promotion, Developing country application, Villages.

A definition of the rural sector, rural industry, rural light engineering industry, technological levels, and production organization patterns is given followed by a discussion of structural features of demand and possibilities; broad promotion policies; a skeleton demand matrix; a skeleton pattern for rural light engineering industry; workshops at the level of the central village; and workshops at the level of a rural market town. An appendix includes useful reference material.

PB80-158306 PC A04/MF A01
Ministerio de Agricultura y Ganaderia, San Jose (Costa Rica). Oficina del Cafe.
Manual de Recomendaciones para Cultivar Cafe. (3a. Edicion)(Manual of Recommendations of Coffee Growing. Third Edition.)
1978, 68p
Text in Spanish.

Keywords: Cultivation, *Coffee, Manuals, Germination, Seeds, Planting, Fertilizers, Plant diseases, Terracing, Costa Rica, Developing country application.

This manual is for the benefit of agricultural technicians and coffee growers. Consideration is given to programs of research, laboratory tests, and technical assistance. Themes included are: Types and varieties; seedplots; handling of the plant, fertilization, and fighting plagues and diseases.

PB80-158728 PC A02/MF A01
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.
Small-Scale Fishermen's Perceptions of the Occupation of Fishing in the Gulf of Nicoya, Costa Rica
Richard B. Polinac. Jul 77, 18p ANTHROPOLOGY/WP-18, AID-PN-AAG-604
Contract AID/csd-2455

Keywords: *Fisheries, Attitude surveys, Fishing, Developing countries, Males, Manpower, Children, *Costa Rica, Developing country applications.

The report examines small-scale fishermen's perceptions of the occupation of fishing in the Gulf of Nicoya, Costa Rica. It is based on 125 interviews with open-ended questions concerning what the fisharmen liked most and least about their occupation; preferences for son's occupation; and the qualities that make a good fisherman. In addition, information regarding preference for and functions of middlemen was gathered, and correlations between perceptions of the fishing occupation and the independent variables of age, education, years fishing, and area of residence were made.

PB80-158975 PC A03/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on 20-30 November, 1978. Project Proposal and Feasibility Data for a 25 Ton/Day Mini-Cement Plant
Background paper
R. Bruce, and M. K. Garg. 2 Oct 78, 32p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Sponsored in part by Agency for International Development, Washington, DC. Prepared by Appropriate Technology Development Association, Lucknow (India).

Keywords: *Cement, *Industrial plants, Portland cements, Manufacturing, Kilns, Production capacity, *India, Development, Operating costs, Developing countries, Developing country application.

The technology of Portland cement is described followed by details of the development work done in India. Appendices provided information on the capital cost and operational details of 25 ton mini cement technology based on vertical shaft kiln; comparative costs of production in large and small scale cement plants in India; and a global survey of vertical shaft kilns.

PB80-159197 PC A04/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
A French/English Glossary of Agricultural Terms
1979, 64p Rept no. REPRINT SER-28
Prepared by American Univ., Washington, DC. American Language Center.

Keywords: *Agriculture, Dictionaries, French language, English language, Agricultural products, Farm management, Terminology, Developing country application.

The bilingual glossary fills one of the needs of French-speaking agriculturists receiving training in English or English-speaking specialists working in francophone areas. It contains over 1500 French terms defined in English and 1500 English terms defined in French. This list of terms is not complete in any sense. It is based largely on suggestions made by experts in training foreign agricultural specialists both abroad and in the United States.

PB80-159205 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Orchard Management
Jun 69, 117p Rept no. REPRINT SER-31

Keywords: *Fruits, Fruit crops, Horticulture, Developing countries, Manuals, Soil properties, Fertilizers, Plant growth, Plant reproduction, Insects, Plant diseases, Planting, Nut trees, Diagrams, Plant nutrition, Developing country application.

This manual is a resource for Peace Corps trainees and volunteers for gaining understanding and knowledge of basic horticultural principles and practices of orchard management. Subject areas have been limited to those of most frequent concern to volunteers in their project activities in fruit tree growing in agricultural programs abroad and particularly with deciduous types trees. Primary emphasis is given to providing explanations and illustrations of horticultural practices with a realistic and meaningful content, and as non-technical a vocabulary as possible. The manual should be used during training as a teaching guide and instructional tool.

PB80-159304 PC A02/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in the Textile Industry of Sri Lanka
Background paper
Iftkhar Afzal. 20 Sep 78, 24p
Report of Working Group No. 3, Appropriate Technology for the Production of Textiles. Sponsored in part by Agency for International Development, Washington, DC.

Keywords: *Textile industry, *Sri Lanka, Technology, Developing countries, Cotton fabrics, Spinning(Staple fibers), Weaving, Textiles, Production, Developing country application.

A background of the textile industry in Sri Lanka is presented. Aspects of the need for a textile industry are explained and choice of appropriate technologies in the textile industry are cited.

PB80-159312 PC A05/MF A01
Centro Nacional de Investigaciones de Cafe, Chinchina-Caldas (Colombia).
Subproductos del Cafe (Coffee By-Products)
Hernan Calle Velez. 1977, 80p Rept no. BOLETIN TECNICO-6
Text in Spanish.

Keywords: *Waste recycling, Plant residues(Organic) *Coffee, Byproducts, Manufacturing, Alcohols, Methane, Feeding stuffs, Yeasts, Rayon, Developing country application, Solid wastes.

This is a report on the utilization of the residues resulting from the coffee process to obtain: honey, alcohol, methane gas, yeast, pectins, oil, chicken feed, electric batteries, viscose rayon and various products also from the shells of the beans. Different techniques are described and the industrial use of the by-products are explained. Many illustrations are included.

PB80-159841 PC A05/MF A01
Grupo de Tecnologia Apropiada, Panama City.
Inventario de Residuos Organicos de Uso Potencial en Panama Para Su Conversion a Gas Metano Y Fertilizantes Organicos (Inventory of Organic Residues of Potential Use in Panama to Obtain Methane Gas and Organic Fertilizers)
Sam Bern. Jul 79, 96p
Text in Spanish.

Keywords: *Animal wastes, *Waste recycling, *Agricultural wastes, *Bioconversion, Solid waste disposal, Garbage disposal, *Methane, *Fertilizers, *Panama, Developing country application, Solid wastes, Energy sources, Energy source development.

Different types and quantities of organic residue in Panama of animal and vegetable origin are studied, with the intention to estimate their value as a source of energy, as biogas and organic fertilizer, in rural areas. The report includes interviews with government officials, private enterprises, visits to garbage disposal sites, and gathering of statistics.

PB80-160021 PC A06/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Strategies for Development of Cement and Allied Industries in Developing Countries
Background paper.
1978, 119p
Report of Working Group No. 5, Appropriate Technology for the Production of Cement and Building Materials. Prepared in cooperation with Cement Research Inst. of India.

Keywords: *Building materials, *Cement, Construction industry, Construction materials, Developing countries, Technology, Raw materials, Production, India, Development, Manufacturing, Industrial plants, Concretes, Planning, Developing country application.

The report discusses the appropriateness of technology and the general outlook on cement and allied industries in developing countries with particular reference to India. The techno-socio-economic base in developing countries as relevant to cement and allied industries is described. Alternative technologies available are cited. Case studies are provided involving cement production, packing cement, and in utilization of cement. The impact of national policies and planning of strategy for development is discussed. Tables and illustrations are included.

PB80-160039 PC A06/MF A01
United Nations Industrial Development Organization, Vienna (Austria).
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. The Role of the Engineering Industry
Background paper.
22 Sep 78, 104p
Report of Working Group No. 1, Appropriate Technology for Heavy Industries. Prepared in cooperation with National Industrial Development Corp. Ltd., India.

Keywords: Engineering, *Technology assessment, Industries, Economic impact, Structural engineering, Industrial engineering, India, Automotive industry, Social effect, *Industrial development, Developing country application, Industrial technology.

The role of the engineering industry as a vehicle of socio-economic upliftment is explained. The report continues with the present state-of-the-art and typical case studies of industries including structural, automobile, railways, metal working machines, power industry, and consumer durables. A comparative study of the trends in the engineering industry is described. Additional topics include a rationale for decentralization of industries; development of capital goods industry as a means of social upliftment; and guidelines for strategy of development.

PB80-160054 PC A19/MF A01
Minnesota Energy Agency, St. Paul.
Local Energy Awareness Handbook
Jan 80, 430p Rept no. MEA-3-80-1

Keywords: Handbooks, Communities, Project planning, Objectives, Guidelines, *Community development, *Energy conservation.

Communities in Minnesota and throughout the country are seeking ways to cut current energy costs, conserve fuel supplies, and prepare for predicted shortages and rising prices. Energy awareness and conservation programs both in public and private sectors help. They can be instrumental in keeping costs down, while maintaining essential services and minimizing lifestyle changes in the community. This handbook is intended to be used as a resource for the local Energy Awareness Committee in a community. It can help a committee which is an officially designated branch of the city government, an ad hoc group of interested citizens, or a special interest arm of another established community organization.

PB80-160617 PC A02/MF A01
Agency for International Development, Washington, DC.
Biological Nitrogen Fixation: Research Needs for Agricultural Development in the Tropics
L. R. Frederick. 1978, 11p Rept no. AID-PN-AAG-127

Keywords: *Nitrogen, Nitrogen fixation, Tropical regions, Leguminous plants, Nitrogen fixing bacteria, Nitrification, Seeds, Cultivation, Developing countries, Developing country applications.

The biological knowledge and technology, and the training and organization of human resources needed to develop a program in biological nitrogen fixation are discussed. Nitrogen, essential for plant growth and for protein and carbohydrate production, is critically important in the growing world food shortage. The use of legumes and inocultants to produce fixed nitrogen is considered and an alternative to factory fixation of N2. Legumes are a major part of the native vegetation in tropical regions, yet only a few species have been developed for agricultural use. Optimal culture of legumes requires both an adequate supply of legume seeds and cultures of rhizobia and proper use by the grower. Principles regarding various aspects of biological nitrogen fixation, adapted from six recently published reviews are listed.

PB80-160625 PC A03/MF A01
Wisconsin Univ.-Madison. Land Tenure Center.
Agrarian Reform in Brazil: A Bibliography. Part II: Regional Development
Training and methods series no. 19 (Supplement).
Jun 78, 50p AID-PN-AAG-373

Keywords: Agronomy, *Land use, *Brazil, Regions, *Agriculture, Economics, Regional planning, Documents, Developing countries, Bibliographies, Developing country application.

The document supplements the bibliography on agrarian reform in Brazil by the Land Tenure Center Library. It contains a brief section entitled 'Regional Development', followed by sections arranged by regions of Brazil and the sub-sections Agriculture, Colonization, and Economic Policy. 569 items are included, some in Portuguese, some in English. Most items were published in the late 1960's and 1970's.

PB80-160674 PC A05/MF A01
Instituto de Investigacion Agropecuaria de Panama, Santiago de Veraguas.
Resumen de la Investigacion Pecuaria del Centro Experimental de Gualaca (Summary of Farming Research from the Experimental Center of Gualaca)
1977, 90p
Text in Spanish.

Keywords: *Agriculture, *Animal husbandry, Agronomy, *Panama, Forage grasses, Feeding stuffs, Research projects, Livestock, Developing country application.

The Experimental Center of Gualaca began its research programs in 1968 with the help of the national government, private enterprises and international organizations. This publication, which is intended for farming technicians and researchers, gathers the summaries of 81 research studies, developed from 1968-1976. It includes different aspects of agronomic re-

search on foraging plants, animal supplementation, and handling and animal improvement.

PB80-160682 PC A03/MF A01
Ministerio de Agricultura y Ganaderia, Panama City.
Las Tierras del Suroeste de Cocle (The Land of the Southwest of Cocle)
Ricardo Ah Chu, and E. Don Hansen. 1962, 49p
Text in Spanish.

Keywords: *Soils, *Land use, Agricultural economics, Soil classification, Investigations, Soil properties, Climate, Project planning, *Panama, Developing country application.

A report is given of the general inventory of the lands and soils of the SW region of the province of Cocle, as the essential element for the utilization of the land, depending on its productive nature. For faster speed in obtaining the data and their application, the method known as 'reconnaissance' is used for the solution of farming and cattle raising problems. The inventory will be useful for the design of agricultural programs, will help the farmer to understand and to better know the soils and land that he works, and will be of great value for the technicians and developers to express judgments and conclusions.

PB80-160740 PC A06/MF A01
Ministerio de Planificacion y Politica Economica, Panama City.
Los Asentamientos Campesinos: Una Experiencia Panamena en Reforma Agraria (Rural Settlements: An Experiment on Agrarian Reformation in Panama)
Stanley Heckadon. Apr 73, 118p
Text in Spanish.

Keywords: *Socioeconomic status, *Agriculture, Agronomy, Populations, *Panama, Rural areas, Surveys, Evaluation, Developing countries, Developing country application, Villages, Self help.

The situation of the Panama rural population is analyzed through historical periods. The marked differences between the two zones of the country; the more sophisiticated area crossed by the Canal and the hinterland of the interior are contrasted. Comparisons are made between the Agrarian Reformation (1963-1968) and the rural settlements (1969-73), designed at self-help enterprises. Conclusions and evaluations considering the problems and the achievements during the four years of existence of the rural settlements are given. Maps, tables, and a bibliography are included.

PB80-160757 PC A13/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Wells Construction: Hand Dug and Hand Drilled
Richard E. Brush. 1979, 291p*

Keywords: Construction, *Water wells, Developing countries, Manuals, Design criteria, Construction materials, Drilling, Water table, Rural areas, Hand tools, Pumps, Drill pipe, Linings, Developing country application.

This manual is for development workers involved in the construction of wells to supply water to a local population for personal consumption. It has been designed to help field workers with little or no construction experience to assist communities in: planning and designing a well appropriate to the needs of the local population; assessing the advantages or disadvantages of locally available construction materials; deciding on the most appropriate construction techniques; and constructing the well step-by-step. Most of the materials, tools, and methods covered in this manual are applicable throughout the world in a variety of local situations, especially in the rural areas of most developing countries.

PB80-161383 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Reports on Roads and Transport Planning in Tropical and Sub-Tropical Countries
L. Cooper. c1979, 41p Rept no. TRRL-SUPPLEMENTARY-162-REV-2

Keywords: *Transportation, *Road transportation, *Roads, Highway transportation, Highway planning, Tropical regions, Terrain, Construction materials, Aggregates, Bitumens, Soils, Developing countries, Highway bridges, Airports, Hydrology, *Traffic engineering, Traffic safety, Foreign technology.

This Report lists various Reports and Papers issued by the Transport and Road Research Laboratory about roads and transport planning in tropical and subtropical countries. (Copyright (c) Crown Copyright 1979.)

PB80-161540 PC A04/MF A01
Ministerio de Agricultura y Ganaderia, Panama City.
El Cocotero en Panama (The Coconut Tree in Panama)
Louis A. Gattoni. 1968, 54p
Text in Spanish.

Keywords: *Coconuts, Nut trees, Tropical regions, Developing countries, Cultivation, Soil properties, Insects, Plant diseases, *Panama, Developing country application, Coconut trees.

The coconut tree is considered to be one of the most profitable plants that help the economy of tropical countries. Its trunk, fruits and flowers are applicable in many industrial uses. In Panama the production of coconuts has greatly diminished due to several causes such as: poor soils lacking in calcium, plagues and diseases generalized in the Caribbean coast, and lack of technical attention. After emphasizing the industrial importance of the coconut, recommendations are listed for the improvement of the cultivation of this tree.

PB80-162134 PC A04/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
Consultation Visit to the Honduras Department of Engineering and Standardization
Final rept.
H. Steffen Peiser. Feb 80, 55p Rept no. NBSIR-80-1969
Grant PASA-TA(CE)-7-71

Keywords: *Metric system, *Standardization, *Honduras, Developing countries, National government, Quality control, Industries, Consultants, Metrication.

The Government of Honduras, with support from the Agency for International Development, asked the National Bureau of Standards to provide consultation on an increased concern with standardization and measurement services. In this report, the author describes his brief visit to Tegucigalpa and his constructive discussions with governmental, industrial, and university authorities. Honduras has very considerable unexploited natural resources and a developing industrial manufacturing base in need of standardization, especially for quality control, to enter world markets. Honduras needs a new Weights and Measures Law and metrology and test laboratories, as well as some assistance for training technicians. Closer cooperation with regional standardization organizations is advocated. Domestically, measurement control in retail markets needs to be developed. Although officially Honduras is metric, the change to metric units has not been widely accepted by the public.

PB80-163470 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Land Preparation and Crop Establishment for Rainfed Lowland Rice
Research paper series
S. K. De Datta, R. A. Morris, and Randolph Barker. Nov 78, 29p IRPS-22, AID-PN-AAG-563

Keywords: *Rice, Rice plants, Cultivation, *Arid land, Soil water, Planting, Water storage, Weed control, Yield, Mulches, Soil fertility, Insects, Plant diseases, Developing country application, Wetlands.

The traditional rainfed rice land preparation transplanting system and alternative new systems of land preparation and crop establishment are reviewed. These latter systems may become economically feasible as a consequence of new rice technology including short duration varieties, herbicides, powerful tillage machinery. The report cites major advantages of wet land tillage in the reduction of draft requirements, weed control, ease of transplanting, lessened soil fertility, and reduced percolation losses. Disadvantages of soil tillage discussed in the study include increased late-season drought risk, high transplanting labor requirements, and power unit size limitations. The report also reviews forms of dryland tillage.

PB80-163546 PC A06/MF A01
Agency for International Development, Washington, DC. Office of Agriculture.
Management of Rangelands and Other Grazing Lands of the Tropics and Subtropics for Support of Livestock Production
Technical series bulletin
Howard B. Sprague. May 79, 115 Rept nos. TSB-23, PN-AAG-547

Keywords: *Forestry, *Animal husbandry, Range grasses, Forage grasses, Livestock, Tropical regions, Management, Land use, Grassland, Deserts, Soil properties, Plant growth, Animal nutrition, Developing country application.

The report assembles and summarizes available information on tropical and subtropical grasslands with particular reference to their potential development and utilization. Examples of outstanding successes in increasing forage production and nutritive values of permanent grasslands are cited. It is concluded that substantial increases in productivity of ruminant livestock is widely feasible by applying known principles and practices.

PB80-163553 PC A07/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Desertification: Process, Problems, Perspectives. Papers Presented During a 14-Week Seminar Series, November 1975-April 1976
Patricia Paylore, and Richard A. Haney, Jr. Sep 76, 134p AID-PN-AAC-604
Report on Arid/Semi-Arid Natural Resources Program.

Keywords: *Deserts, *Arid land, Meetings, Soil erosion, Deterioration, Vegetation, Ecology, Droughts, Salinity, Developing country application, Desertification.

This report contains a series of twelve papers which were presented during a continuing program of seminars addressing the process of desertification between November 1975 and April 1976 at the University of Arizona. Desertification is defined as the process of environmental change characterized by increasing aridity and intensification of distinct geomorphological processes, desiccation and increasing salinity of soils, and a manifest degradation of vegetative cover. The first seven papers discuss the process of desertification from the view point of the generalist, and address the problems of reversing desertification, consequences of desertification, effects of atmospheric dust and surface albedo on desertification, ecology of desertification, effects of desertification on land degradation and water resources, and the interrelationship between vegetation, erosion, and stream flows.

PB80-166267 PC A15/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
Standardization and Measurement Services in Indonesia
Final rept.
H. Steffen Peiser, Noel J. Raufaste, Raymond C. Sangster, Benjamin M. Gutterman, and Penelope M. Odar. Sep 79, 350p Rept no. NBSIR-78-1583
Grant PASA-TA(CE)-6-71

Keywords: Measurement, Standards, *Indonesia, *Standardization, Calibrating, Metrology.

At the request of the Indonesian State Minister for Research and Technology, the National Bureau of Standards conducted a two-week survey of standardization and measurement systems in support of industrialization. There were six topics of specialization: (1) Food and Food Safety, (2) Building and Construction, (3) Quality Control in Industry, (4) Safety Standards, (5) Calibration, Instrumentation, and Metrology, and (6) Industrial Measurement Techniques. In the executive summary the appraisal of the existing systems for standardization and measurement is coupled with recommendations. A background section is followed by one with the Indonesian specialists' assessments of needs and opportunities.

PB80-169105 PC A05/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Transportation in Underdeveloped Countries
Feb 79, 98p

Keywords: *Transportation, Developing countries, Meetings, Urbanization, Mobility, Economic development, Urban transportation, Urban areas, Rural areas, Tanzania, Transportation planning, Energy consumption, Rural transportation, Developing country application.

These papers were presented in one of the Work-Sessions at the Second International Symposium of Engineering held at 'Universidad Centroamericana Jose Simeon Canas' from the 19th to the 23rd of February 1979. The document describes problems in underdeveloped countries related to transportation; rapid urbanization, which leads to the development of high residential areas, and often bad-planned transportation systems. Energy expenditure in transportation is usually a high percentage of total Energy consumption; therefore, the necessity of evaluating transportation programs and planning transportation alternatives is of prime importance, especially because present trends indicate that such energy consumption is increasing.

PB80-169113 PC A02/MF A01
Farmer Cooperative Service, Washington, DC.
How to Start a Cooperative
Educational circular 18
Irwin W. Rust. 1963, 25p

Keywords: Organizations, Management, Facilities, Operating costs, Personnel, Marketing, Developing countries, Cooperatives, *Agricultural cooperatives, Developing country application.

The step by step outline of how to bring a cooperative into being starts out by explaining what a cooperative is. The steps it follows are: Arranging the first meeting; examining the need for a cooperative and estimating potential membership; management skills needed; facilities needed; operating costs; capitalization; drafting legal organization papers; first meetings of members and board of directors; and general rules for success. The rules for success are explained and cover legal matters, expert help, management, flexibility, and quorums. A sample survey report and a sample organization agreement are included as appendices.

PB80-169444 PC A08/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Papel de la Tecnologia en el Desarrollo Y Dependencia de los Pueblos (The Role of Technology on the Development and Dependency of Countries)
Feb 79, 166p
Text in Spanish.

Keywords: *Technology transfer, *Industrial development, Economic development, Latin America, Technology assessment, Agricultural engineering, Food, Technological intelligence, Nutrition, Economic analysis, Developing countries, Developing country application.

The patterns of economic growth experienced in Latin America countries are discussed, mainly during the last 20 years. Some attention is given to the philosophical meaning of appropriate technology, and to the nutritional problems in Latin America and their relationship with economics. Some of the themes studied include: Efficiency and justice in the utilization of technology; examples of developing with unappropriate technology; the role of agriculture and sciences and technology of foods, and others. An abundant bibliography, some statistics, and tables are included.

PB80-169717 PC A02/MF A01
Denver Research Inst., CO. Office of International Programs.
Central America: Fungal Fermentation of Coffee Waste
Suellen Sobald Edwards. Dec 79, 24p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 6.

Keywords: Technical assistance, Farm processing, *Coffee, *Agricultural wastes, Fermentation, Fungi, Feeding stuffs, Proteins, Pollution control, Technology, Organizations, *Guatemala, *El Salvador, Developing countries, Developing country application.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It describes the fungal fermentation of a coffee waste program under way in Guatemala and El Salvador that will result in useful protein byproducts. The cultivation of fungi on the coffee pulp juice represents a useful technological advance for less developed countries--it will help the control of some of the pollution involved with coffee production.

PB80-169725 PC A03/MF A01
Denver Research Inst., CO. Office of International Programs.
Sri Lanka: The Ceylon Institute of Scientific and Industrial Research
Donald D. Evans. Dec 79, 37p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Aplication of Appropriate Technology and Development, Case Series No. 7.

Keywords: *Research and development, *Technology transfer, Research management, Technical assistance, Technology innovation, Research projects, Industries, Developing countries, Specialized training, Government policies, Financing, *Sri Lanka, Developing country application.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It reports on the Ceylon Institute of Scientific and Industrial Research which has had many technological advancements to its credit and discusses problems in staffing, training, equipment, government and industrial relationships, and finance.

PB80-169741 PC A02/MF A01
Denver Research Inst., CO. Office of International Programs.
Brazil: Explosive Metalworking Program
James M. Miller, Jim D. Mote, and Henry E. Otto. Dec 79, 24p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 4.

Keywords: Metal working, *Explosive forming, Cladding, Hardening(Materials), Metal industry, Development, Technical assistance, *Brazil, Developing countries, Developing country application.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology in development. In this project, the introduction of a metallurgical technology--explosive forming, cladding, and hardening--has been adapted into a small but profitable industry in the state of Sao Paulo.

PB80-169758 PC A03/MF A01
Denver Research Inst., CO. Office of International Programs.
Thailand: The Introduction of Mint Agriculture
Ronald P. Black, and Sachee Piyapongse. Dec 79, 30p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 5.

Keywords: *Crops, *Agriculture, Farm crops, Farm processing, Menthol, Production, *Thailand, Developing countries, Mint, Developing country application, Agricultural extension programs.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It describes how mint agriculture and processing were introduced in Thailand. It also details how farming, mint oil extraction, menthol production, and related research activities were developed. The research organizations involved in the process are also examined.

PB80-169766 PC A02/MF A01
Denver Research Inst., CO. Office of International Programs.
Malaysia: Small-Scale Brick Manufacturing
Ronald P. Black, A. Rahim Bidin, Woo Seng Khee, and Nik Ahmad Kamil. Dec 79, 24p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 3.

Keywords: Technical assistance, *Bricks, Manufacturing, Technology, *Industrial plants, Development, *Malaysia, Developing countries, Developing country application.

This case history has been written to assist development planners, personnel of industrial research institute, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It describes a typical small-scale brick factory. The future challenges that the industry may have to face are related by the factory owner. An industry forecast from an expert at the Standards and Industrial Research Institute of Malaysia is presented.

PB80-169774 PC A02/MF A01
Denver Research Inst., CO. Office of International Programs.
Colombia: The Composite Flour Program
James M. Miller. Dec 79, 21p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 2.

Keywords: *Food processing, Flours(Food), Technical assistance, Research, Organizations, Technology, *Wheat, *Rice, Soybean plants, Bread, Developing countries, *Colombia, *Food products, Developing country application.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It discusses efforts made by the Instituto de Investigaciones Tecnologicas (IIT) to reduce imports of wheat by substituting locally available flours, e.g., defatted soya and rice, particularly in breads and totally in pastas.

PB80-169782 PC A03/MF A01
Denver Research Inst., CO. Office of International Programs.
Thailand: Cassava Pelletizing Technology
Ronald P. Black, Wanawan Peyayopanakul, and Sachee Piyapongse. Dec 79, 29p
Contract AID/ta-C-1337
Report on Industrial Research Institutes: Their Role in the Application of Appropriate Technology and Development, Case Series No. 1.

Keywords: *Crops, Technical assistance, Farm processing, Farm crops, Raw materials, Industries, Farms, Food processing, Plants(Trees), Developing countries, Marketing, Research management, Organizations, Exports, *Thailand, Developing country application, Industrial development, Tapioka, Cassava plant.

The case history has been written to assist development planners, personnel of industrial research institutes, and USAID mission personnel in understanding the role that IRIs can and do play in the application of technology to development. It examines indigenous technology for producing cassava pellets as well as the related steps from the growing of the cassava through marketing the cassava pellets abroad.

PB80-169907 PC A02/MF A01
Department of Agriculture Extension Service, Washington, DC.

Participants Learn by Doing
Sep 63, 14p

Keywords: *Home economics, *Training, Specialized training, Households, Developing countries, Kitchens, Females, Residential buildings, Sanitation, Developing country application.

AID has run a program to bring elementary principles of health, sanitation, and improved homemaking practices to developing countries through workshops. The plan of the workshops and the topics covered in the morning and afternoon sessions are described. Various topics were covered including control of insects, waste disposal, safe drinking water, child care, laundry, iceless refrigerators, mattresses, oil can ovens smokeless stoves, and improvised showers. The factors that contributed to the success of the workshops are also analyzed. Available in French as PB80-113236.

PB80-169915 PC A02/MF A01
Farmer Cooperative Service, Washington, DC.
Managing Farmer Cooperatives
Kelsey B. Gardner. Nov 63, 21p

Keywords: *Agricultural cooperatives, Agriculture, Management, Policies, Developing country application, Cooperatives.

Farmer Cooperative business enterprises require good management. It is important that members, directors, and employees of cooperatives meet their respective responsibilities in fulfilling this vital need. This publication explains some basic aspects of what management in a cooperative is and how responsibilities for it are divided among members, boards of directors, and employees.

PB80-169923 PC A04/MF A01
Soil Conservation Service, Washington, DC.
Irrigation on Western Farms
Jul 59, 60p Rept no. AIB-199

Keywords: *Irrigation, Farms, Irrigation canals, Soil properties, Drainage, Water pipelines, Ditches, Selection, Efficiency, Maintenance, Developing country application.

Proper irrigation will help the farmer obtain the maximum yield from his acreage. This booklet will help the farmer know his land and understand the soil profile and soil properties important to irrigation. Soil moisture and crop growth, and topography and drainage are explained as are the means to determine how to analyze one's own farm. The principle methods of irrigation including border irrigation, level border and basin irrigation, contour ditch irrigation, furrow irrigation, corrugation irrigation, sprinkler irrigation, subirrigation, are covered. Other problems concerning irrigation are also discussed.

PB80-169998 PC A07/MF A01
Panama Univ., Panama City. Inst. Politecnico.
Approvechamiento de Desechos para la Generacion de Bio-Gas como Fuente de Energia (Utilization of Residues for the Obtention of Bio-Gas as an Energy Source)
Jose del C. Gonzalez B, and Luis Augusto Munoz V. 1978, 143p
Text in Spanish.

Keywords: *Waste recycling, *Bioconversion, *Methane, Fermentation, Biomass, Anaerobic processes, Sources, Food, *Animal wastes, *Agricultural wastes, Theses, Solid wastes, *Manures, Synthetic fuels, Manufactured gas, Developing country application.

This report explains the production of methane gas by the process of anaerobic fermentation, from organic sources such as poultry or cow manure. Analyzes the inconveniences at the present of using human excreta. Other sources are: food waste, mud, vegetable residues, all useful for conversion to obtain methane gas. It gives ample details on the chemical composition of the various bio-gas, depending on its origin, and the uses and industrial future of the gas. Mechanical devices such as batteries and machinery are explained, with illustrations. A list of safety tips is included.

PB80-170079 PC A02/MF A01
Ministerio de Desarrollo Agropecuario, Panama City.
Laboratorios Experimentales Para la Formacion de Cuadros Organizadores de Empresas de Auto Gestion Campesina (Experimental Laboratories for Organizing Boards of Farming Enterprises)
Ivan Labra. Nov 77, 14p
Text in Spanish.

Keywords: *Agriculture, Farms, Organizations, Panama, Farm processing, Farm management, Rural sociology, Developing countries, Developing country application.

The report is an exposition of basic concepts for the organizing of ideas of individual conscience that evolves according to the type of productive activity to be performed. It analyzes the application of laboratories for the organization of country workers in Panama. The social composition of the groups as well as the equipment necessary and functions of the participants are described.

PB80-170285 PC A06/MF A01
Centro de Desarrollo Industrial del Ecuador, Quito.
Technologia Simplificada de la Produccion del Cuero (Simplified Technology of the Production of Leather)
Jul 76, 103p
Text in Spanish.

Keywords: *Leather, Processing, Hides, Tanning materials, Technical assistance, Developing countries, Production, Developing country application.

The study presents a technology of production of leathers by transforming and improving the technology of today. The curing of hides is studied extensively with consideration given to the different origins of the leather including diagrams explanatory of the chemical reactions and the most recommended reactives to be used.

PB80-170293 PC A08/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Problemas Energeticos en Paises Subdesarrollados (Energy Problems in Developing Countries)
Feb 79, 17p
Text in Spanish.

Keywords: Mexico, International trade, Economics, *Energy, Developing country application.

The need for creating energy technicians at post graduate levels in Mexico and other countries is explored. A history and description of OPEC agreements and reflections on the world economy are presented. Tables, graphics, illustrations, and a bibliography are included.

PB80-170301 PC A03/MF A01
Instituto de Recursos Hidraulicos y Electrificacion, Panama City.
Utilizacion de la Pulpa de Cafe en la Produccion de Gas Combustible (Bio-Gas Utilization of Coffee Pulp in the Production of Bio-Gas)
Samuel Bern. 1980, 50p
Text in Spanish.

Keywords: *Bioconversion, *Waste recycling, Anaerobic processes, Fermentation, Pulps, *Coffee, Industrial wastes, Waste treatment, Developing countries, Developing country application, Waste processing, Biogas process.

Presented in this report is the experimental work for the most part of the studies, not only achieved in the laboratory, but also on the field under different conditions for the process of anaerobic fermentation of the coffee pulp. The production of bio-gas was tested for a period of eight months. Conclusions, charts, and a bibliography are included.

PB80-170319 PC A04/MF A01
Centro de Investigaciones en Tecnologia de Alimentos, San Jose (Costa Rica).
Obtencion de un Frijol Precocido Mediante Extrusion (Obtention of Precooked Beans by Extrusion)
Jorge Zuniga, and Lyzette Henriguez Amestoy. 1979, 55p
Text in Spanish.

Keywords: *Food products, Beans, Cookery, Food preparation, Cost analysis, Sauces, Food packaging, Equipment, *Costa Rica, Developing country applications, Precooking.

The importance of the beans (Frijol) in the diet of Costa Rica is stressed and the advantages for the school cafeteria that will go with a precooked bean obtained through extrusion is explained. Steps for the process are listed in detail including costs of production, salaries, packing, and equipment for the whole program. Tables, conclusions, and recommendations are included.

PB80-170376 PC A03/MF A01
International Cooperation Administration, Washington, DC.
Etudes a l'Etranger Sous les Auspices de l'AID (Participants in Technical Cooperation)
Jul 57, 27p
Text in French.

Keywords: *Training, Specialized training, Developing countries, Students, Foreign countries, Cooperation, Technical assistance, Developing country application.

The pamphlet describes AID's foreign study and participant training programs and how they operate. Training may take place either in the developing countries themselves or in the U.S. In the latter case travel to and from the U.S. is covered. Other programs are also mentioned such as observation trips, seminars, workshops, and international cultural exchange programs. The report is available in English as PB-294 361.

PB80-170723 PC A06/MF A01
Centro de Desarrollo Industrial del Ecuador, Quito.
Principios Fundamentales de la Technologia Quesera (Fundamental Principles of Cheese Technology)
Elminia M. de Prieto, and Edward Fisher. Sep 76, 116p
Text in Spanish.

Keywords: *Food products, *Milk, Cheeses, Food processing, Fermentation, Pasteurizing, Temperature, Classifications, Developing country application.

The essential steps for the making of cheeses is presented. The classification of cheeses and the fermentation process (natural or chemically induced) are explored in detail.

PB80-170806 PC A09/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Development of Small Hydroelectric Projects in Appalachia
Final rept.
John L. Warren. Dec 79, 182p RTI/1788/00-01F, ARC-78-204/NC-6521
Contract ARC-78-204/NC-6521
Sponsored in part by North Carolina State Dept. of Administration, Raleigh. Prepared in cooperation with Wind and Water Power, Harrisville, NH.

Keywords: *Hydroelectric power, Feasibility, Site surveys, Evaluation, Cost analysis, Financing, Appalachian Mountain Region(United States), Electric power plants, Hydroelectric power plants.

The project identified small hydroelectric sites in the Appalachian counties of North Carolina with development potential. From this list, three sites, North Fork Reservoir Dam owned by the City of Asheville, the Town of Highlands Dam, and Capitola Dam were chosen for further detailed feasibility analyses. Based on (1) detailed inspection of the sites, (2) analysis of construction costs, and (3) identification of generic problems associated with small hydro, a cost-effectiveness analysis of the financial feasibility of each site will be prepared. As part of this task, the effects of power generation on existing operations at each site and the potential power customers will be identified.

PB80-170814 PC A03/MF A01
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Papa en Panificacion (Utilization of Potato Flour in the Making of Bread)
Technical bulletin no. 7
Oswaldo Proano, Ligia de Benitez, Oswaldo Acuna, and Marco Moran. Dec 74, 43p
Text in Spanish.

Keywords: *Food products, Bread, Baking, Flours(Food), Potatoes, *Ecuador, Developing country application.

Due to the overproduction of potatoes in Ecuador, there exists the problem of utilization. The physical and chemical characteristics of various flours are discussed with emphasis on potato flour. Tables and graphics of bread at different stages of the baking process are included.

PB80-171002 PC A05/MF A01
Centro de Desarrollo Industrial del Ecuador, Quito.
Reporte Tecnico Sobre la Industrializacion Integral del Pseudo-Tallo de Banano (Technical Report on the Integral Industrialization of the Pseudo-Stem of Banana Trees)
May 79, 81p
Text in Spanish.

Keywords: *Fruits, *Fibers, *Industrial plants, Manufacturing, Textiles, Trees(Plants), Cordage, Starches, Machinery, Production methods, *Ecuador, Developing countries, Developing country application, Banana trees.

A description is given of the banana plant and areas where they are planted in Ecuador. Methods to utilize the banana fiber by mechanical processes for the production of textiles, ropes, boards, and possibly to obtain starches for nutritional purposes are presented. Additions to the document include photos, description of machinery, and a large bibliography.

PB80-171010 PC$9.50/MF A01
Volunteers in Technical Assistance, Inc., Mt. Rainier, MD.
Directory of Development Resources: Africa
Dennis Culkin, Sabra Breslin, and Marilyn Chakroff.
Jul 79, 213p

Keywords: *Technology transfer, Resources, Developing countries, Directories, Organizations, *Africa, Development, Services, Developing country applications.

The volume represents the sub-Saharan section of VITA's series of regional directories of development resources. The directory is arranged by country with development organizations listed alphabetically within each country section. Each listing contains the name of the organization; the mailing address; the street address; the person to contact; and the organization objectives, areas of activity, services, and publications. There are three separate indexes in the directory. The first lists all the organizations alphabetically without geographical bias. The second is an area activities index. The third is a services index. 233 organizations are listed.

PB80-171234 PC A04/MF A01
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Yuca en Panificacion (Utilization of Yucca Flour in the Making of Bread)
Technical bulletin no. 8
Oswaldo Acuna Gordilla. Nov 74, 54p
Text in Spanish.

Keywords: *Food products, Bread, Flours(Food), Baking, *Wheat, Substitutes, Developing country application, Yucca.

A plan for substituting up to 20% of wheat flour for yucca flour is explained in this report. A description is given of the equipment, methods, and nutritional characteristics of the final product using yucca flour. Many tables are included for clarity.

PB80-171242 PC A03/MF A01
Escuela Politecnica Nacional, Quito (Ecuador).
Utilizacion de la Harina de Arroz en Panificacion (Utilization of Rice Flour in the Making of Bread)
Technical bulletin no. 12
Ligia de Benitez, Oswaldo Acuna, Marco Moran, Francisco Aulestia, and Alfonso Romero. 1977, 38p
Text in Spanish.

Keywords: *Food products, Broad, Flours(Food), Baking, *Rice, Color, Weight(Mass), Texture, Mixtures, Acceptability, Developing country application.

The characteristics of rice flour and its suitability for making bread are described. Other flours and their properties when mixed with wheat flour are cited. Tables are provided which show color, weight, texture, method of baking, and evaluation of the mixtures.

PB80-171267 PC A03/MF A01
Escuela Politecnica Nacional, Quito (Ecuador).
La Soya: Fuente de Proteina y Aceite (The Soya Bean: Source of Protein and Oil)
Technical bulletin no. 10
Jorge Davila Torres. Feb 75, 48p
Text in Spanish.

Keywords: *Soybeans, Nutritive value, Soybean oil, Proteins, *Ecuador, Flavor, Developing country application.

Studies are presented on human nutritional requirements and available protein sources, mainly in Ecuador. The characteristics of the soya bean are described. Decisions on the technology to exploit the agricultural and industrial possibilities of the soya bean are discussed. Tables and statistics with information on protein content are provided.

PB80-173719 PC A08/MF A01
Instituto de Investigaciones Tecnologicas, Bogota (Colombia).
Diagnostico y Evaluacion Tecnica de los Moltinos de Cana para Panela (Diagnosis and Technical Evaluation of Cane Mills to Obtain Brown Sugar)
Final rept.
1978, 153p
Text in Spanish.

Keywords: Grinding mills, *Sugarcane, *Agricultural machinery, Production, Design, Photographs, Evaluation, Developing country application, *Molasses.

This study gives an evaluation and diagnosis of the mechanical equipment used for the grinding of sugar cane for the production of molasses. The material is expressed in elementary principles of mechanics and design of machinery. Tables and photographs are included for information.

PB80-173792 PC A12/MF A01
Hospital del Nino, Panama City.
Salud Integral Y Medicina Comunitaria (Health and Medicine in the Community)
Jose Renan Esquivel. 1977, 263p
Text in Spanish.

Keywords: *Birth control, *Health manpower, *Health care delivery, *Latin America, Family planning, Pediatrics, Behavior, Environments, Community health services, Developing country application, Primary health care.

The report contains a collection of twelve research studies on different aspects of health and medicine, presented in various countries of Latin America. The areas covered are: health and medicine in the community; planned parenthood; health and human growth; future of pediatrics; health and human behavior; health and problems in the institutional pediatrics; health and medicine in Latin America; health and vital environment; health and medicine in developing areas; health and primary care in the communities; nutrition; and preparation of the pediatric residents.

PB80-175060 PC A07/MF A01
Centro de Investigacion y Capacitacion R.L., San Jose (Costa Rica).
Informe del Programa de Capacitacion Centroamericana (Report on the Capacitation Program of Central America)
Tito Quiros, Aldo Cardona, and Ricardo Puerta.
1979, 144p
Text in Spanish.

Keywords: *Training, *Central America, Specialized training, Developing countries, Project management, Honduras, El Salvador, Nicaragua, Guatamala, Services, Costa Rica, Panama, Developing country application, Villages.

The report gathers the experience accomplished in the Capacitacion Program in Central America, which lasted a period of two years (1977-1978) in the six countries in Central America. It includes orientations about projects of capacitation utilizing the participating methodology. It includes course and seminar design whose content derived from the process and experience of the participants.

PB80-175078 PC A09/MF A01
Ministerio de Educacion, Panama City. Dept. Tecnico.
Manualidades (Handmade Crafts)
A. Martinez Surroca. 1954, 176p
Text in Spanish.

Keywords: *Handicrafts, *Wood products, *Food storage, Crafts, Developing countries, *Furniture, Decorating, Manuals.

The manual describes how to make numerous objects. It is used to encourage the imagination of students to be able to build practical and economic objects such as simple furniture, flower pots, lamp shades, radios, and how to preserve fruits and vegetables, wines, vinegars, and cheeses. The manual is illustrated.

PB80-175326 PC A04/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Problemas Hidraulicos en Paises Centroamericanos (Water Problems in Countries of Central America)
Pedro Miguel Estrada, Fidel Antonio Ramos, Daysi Sobalvarro, and Ricardo Jimenez. Feb 79, 72p
Text in Spanish.

Keywords: Developing countries, *Water supply, Soils, *Drought, Bibliographies, *El Salvador, Maps, Developing country application.

Three studies in water problems are presented. Water Problems in El Salvador is a technical study of the cycle of water in this country, with final recommendations to solve future problems of scarcity. Torrential Problems in El Salvador is a study of the land, water resources, inclination of the land, soils, and sewages. Water Supply in Rural Areas cites international agreements on the problem of water supply, statistics, and analysis of the problem. A bibliography, maps, and photos are included.

PB80-175789 PC A06/MF A01
Universidad Centroamericana Joso Simeon Canas, San Salvador (El Salvador).
Problemas de Contaminacion Y Tratamiento de Contaminantes (Problems of Contamination and Treatment)
Olga Armida Esquivel, Lilia Albert, and Porfirio Aldana. Feb 79, 102p
Text in Spanish.

Keywords: *Pesticides, Contamination, Meat, Industrial medicine, Chlorine organic compounds, Effluents, Mexico, *Central America, Treatment, Food, Employees, Cotton plants, Polychlorinated biphenyls, Developing country application, Pesticide residues.

This report is a collection of five articles which include: Pesticide in commercial meat products in El Salvador; Pesticides in commercial meats in the San Salvador area; Mexican industrialized food contamination by polychlorinated biphenyls residues; Study of the effects of pesticides on workers of cotton plants; and The treatment of liquid industrial effluents.

PB80-176969 PC A05/MF A01
Arkansas Water Resources Research Center, Fayetteville.
Water, Waste and Quality Management During Preparation and Processing of Vegetables
Completion rept. Apr 75-May 79
W. A. Sistrunk. Aug 79, 85p PUB-65, OWRT-A-032-ARK(1)

Keywords: *Vegetables, *Food processing, *Industrial wastes, Operations, Washing. Cooling, Biochemical oxygen demand, Potatoes, Bears, Anaerobic processes, Solid waste disposal, Nutrients, Canning.

Effluent from vegetable processing plants in the Ozark region was monitored to test and develop new systems of washing, peeling and blanching; to develop methods for utilization of solid wastes; and to reduce effluent wastestrength without affecting vegetable quality. From a processing plants' survey the following operation or factors were found to be the most critical: (1) washing and cleaning, (2) blanching and cooling,

(3) high wastestrength from Irish potatoes, dry beans, and hominy processing, (4) suspended solids removal, and (5) excessive fresh water use. Various processing techniques were tested and waste water was sampled for biochemical oxygen demand, chemical oxygen demand, total suspended solids, settleable solids, and total solids. The new system of leafy greens washing cut water use by 70% while reducing wastestrength by 50%.

PB80-176985 PC A03/MF A01
Centro de Investigaciones en Tecnologia de Alimentos, San Jose (Costa Rica).
Posible Transferencia de la Tecnologia para el Desarrollo Rural Basada en la Experiencia de Costa Rica (Possible Transference of Technology for Developing of Rural Areas Based on the Experience in Costa Rica)
Luis Fernando Arias. Nov 79, 32p
Text in Spanish.

Keywords: *Costa Rica, Food composition, Nutrition, *Technology transfer, *Agricultural economics, Agricultural engineering, Socioeconomic status, Farm management, Nutritive value, Food consumption, Rural areas, Health, Developing country application, *Industrial development, Rural development.

The report presents the exposition of the Programa de Alimentacion y Nutricion (PAN) projects to cover the demands of food required by the population of 700,000 beneficiaries at least twice a day and the politics of the farm and industrial development. The knowledge of agricultural and scientific and technical matters on food and nutrition as integrated for the improvement of the socio/economic and health of the Latin American communities is described.

PB80-178270 PC A09/MF A01
Maynard Research Council, Inc., Pittsburgh, PA.
Study of a Mechanism to Foster University/Small Business Interaction. Phase I
Final technical rept.
18 Feb 80, 177p NSF/RA-800018
Grant NSF-ISP77-14151

Keywords: *Technology transfer, Universities, Technology innovation, Technological intelligence, Project management, Objectives, Problem solvings, Surveys, Utilization, Pennsylvania, *Small businesses.

The project was undertaken to find effective methods of stimulating technology transfer between academic institutions and small businesses. Special attention was given to methods of reducing existing barriers. The report presents the background and history of the project, its rationale, methods and procedures, changes in approach and personnel, and findings.

PB80-179732 PC A06/MF A01
AIA Research Corp., Washington, DC.
Solar Domestic Hot Water. A Reference Manual
1979, 117p HUD-0001230
Sponsored in part by Department of Energy, Washington, DC., and Boeing Aerospace Co., Seattle, WA.

Keywords: Manuals, Hot water heating, Performance evaluation, Design, *Solar water heating.

For builders, contractors, architects, and engineers, this reference manual details the decisionmaking process that the builder or designer follows to evaluate and select the appropriate solar hot water system. It provides methods for estimating and evaluating the performance of any solar hot water system, as well as successful applications which have occurred through the HUD Demonstration Program. It also highlights the common pitfalls encountered in this field, such as installation practices, collector quality control, and system leakage, and suggests ways to avoid their reoccurrence. The manual also addresses such topics as how to employ codes and solar standards, as well as legislative and economic considerations. A sample problem is included which systematically works through the entire design process leading to a solution. Diagrams and tabular data are included. An appendix contains a bibliography, a glossary, an index, a survey of sizing methods, an annual insolation chart, and conversion factors.

PB80-179898 PC A11/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Communicable Disease Control Planning in Developing Countries: Communicable Diseases Control Planning
International Health Planning Methods series no. 1
Karl A. Western, Stanley I. Music, A. N. Angle, S. O. Foster, and R. C. Hogan. 1979, 244p* Rept no. DHEW/PUB/PHS-79-50080

Keywords: *Diseases, Infectious diseases, Developing countries, Public health, Programs, Evaluation, Guidelines, Immunization, Surveillance, Preventaive medicine, Epidemiology, Disease vectors, Manuals, Developing country application, *Health planning, Program evaluation, Disease control, State of the art.

This volume for the planning and evaluation of communicable disease control programs is the first volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This volume discusses specific aspects of disease control programs, such as program organization, surveillance systems, and immunization projects. Articles on specific disease and disease types cover malaria, tuberculosis, leprosy, venereal disease, filariasis, schistosomiasis, onchocerciasis, trachoma, bacterial enteric diseases, parasitic enteric disease and rabies. This manual presents the current 'state-of-the-art' in the planning and evaluation of specific disease control programs. It outlines the complexities of epidemiologic interactions between disease causing organisms and their reservoirs and hosts in different geographic, climatologic, and cultural settings. With an understanding of a disease and its epidemiologic correlates in a given setting, effective control methods can be planned and evaluated.

PB80-179906 PC A07/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Environmental Health Planning in Developing Countries
International Health Planning Methods series no. 2
John Hanlon, Vic Wehmann, Gar Hart, James Thompson, and Irv Taylor. 1979, 127p* Rept no. DHEW/PUB/PHS-79-50081

Keywords: Developing countries, Manuals, Guidelines, Hazards, Public health, Developing country application, *Health planning, Environmental health, Health plans.

This environmental health planning manual is the second volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating environmental health planning into national plans for economic development. The manual contains a compilation of assessment issues, data considerations, alternative technologies, and practical planning methods specifically related to developing countries. Three general objectives are used: (1) to describe the inter-related environmental hazards to health relevant to people in developing countries; (2) to identify competing elements, priorities, and institutional relationships affecting available solutions; and (3) to offer components needed to make planning decisions, including recommendations for data collection methods, surveillance methods, standards, and alternative technologies. In addition to the need for fundamental improvements in such areas as drinking water supply, wastewater and excreta disposal, and pest control, the occasionally adverse effect of economic development projects is cited. Examples are drawn from the fields of agriculture, industry, transport, and land use patterns.

PB80-179914 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Manpower Planning: Health Manpower Planning
International Health Planning Methods series no. 3
Robert J. Staff, and Dennis R. Porter. 1979, 86p* Rept no. DHEW/PUB/PHS-79-50082

Keywords: Developing countries, Manuals, Guidelines, Assessments, Models, Education, Developing country application, *Health manpower, *Health planning.

This manual for health manpower planning in developing countries is the third volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. Generally, an assessment model for health personnel planning in undeveloped countries is not available. This assessment manual provides a conceptual and methodological framework for the analyst and policy planner for the development and use of health personnel. Health manpower planning is a difficult task, affected by numerous variables. It is also a relatively long range task, since the health manpower supplies of the future must be developed through training and education opportunities years before new practitioners become active in the field. This manual discusses various methods of planning for the use of medical assistants and auxiliaries to provide primary health care in rural areas where it is difficult to attract or maintain full time physicians.

PB80-179922 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Socio-Cultural Factors in Health: Socio-Cultural Factors in Health Planning
International Health Planning Methods series no. 4
John Hanlon, and Susan C. M. Scrimshaw. 1979, 79p* Rept no. DHEW/PUB/PHS-79-50083

Keywords: *Socioeconomic status, Developing countries, Behavior, Public health, Guidelines, Manuals, Psychology, Central America, South America, Middle East, Asia, Africa, Technology transfer, Developing country application, *Health planning, Sociocultural patterns, Social factors, Delivery of health care.

This manual describes sociocultural and behavioral factors that affect the planning and delivery of health care services in developing countries. It is the fourth volume in a series of works known collectively as the International Health Planning Methods Series. Material selected for use in this volume includes a broad range of sociocultural, psychological and behavioral information. Central and South American, Middle Eastern, Asian and African medical systems are described within a cultural context, and special attention is given to obstacles to the transfer of medical technology. The purpose of this volume is threefold: (1) to identify socio-cultural, psychological and behavioral factors for the benefit of health care planners in developing countries; (2) to discuss principles of culture and cultural change to the extent that it aids effective and responsible health care interventions; and (3) to suggest methods for gaining relevant data for making accurate assessments and effective plans for improved health care.

PB80-179930 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Facilities Planning in Developing Countries: Health Facilities Planning
International Health Planning Methods series no. 5
Dennis R. Porter, Robert J. Staff, and Melvin Whitfield. 1979, 92p* Rept no. DHEW/PUB/PHS-79-50084

Keywords: Developing countries, Public Health, Guidelines, Manuals, Development, Distribution, Developing country application, Health facilities, *Health planning.

This manual deals with the subject of health facilities planning in developing countries. It is the fifth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This manual provides a framework for the planner who is concerned with the development and distribution of various types of health care facilities. While several specific examples are provided to illustrate particular points throughout the text, the emphasis in this manual has been placed on developing a conceptual framework that is useful as a model planning tool that can be adapted to meet local needs and resources. For example, geographical, climatic, and socio-cultural factors should have great impact on the architectural design and site selection of the health facility. While general concerns have been

identified here, no attempt has been made to provide a detailed architectural design to meet the needs of each climatic or geographical condition. Specific adaptations must be made by the planner.

PB80-179948 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Pharmaceutical Supply System Planning in Developing Countries: Pharmaceutical Supply System Planning
International Health Planning Methods series no. 7
Leif Schaumann, Martin M. Rosner, and John M. Morson. 1979, 93p* Rept no. DHEW/PUB/PHS-80-50086

Keywords: *Drugs, Developing countries, Distribution systems, Manuals, Guidelines, Public health, Rural areas, Low income groups, Developing country application, *Health planning.

This manual for pharmaceutical supply systems planning in developing countries is the seventh volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. Generally, less is known about pharmaceutical supply systems than about the overall health care systems of which they are an integral part. Particularly in rural areas of lesser developed countries, the pharmaceutical supply system can be a critical part of the health care system. Evidence suggests that no country possesses an ideal pharmaceutical supply system, and virtually all supply systems are affected to some degree by issues and policies more concerned with politics, economics, education, and law, as well as those governing medicine and public health. This manual provides objective guidelines to assist health care planners to develop improved pharmaceutical supply systems within the framework of national development planning. Particular emphasis has been placed on the importance of making pharmaceutical products available to the rural poor segment of the LDC population.

PB80-179955 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Health Sector Financing in Developing Countries: Health Sector Financing in Developing Countries
International Health Planning Methods series no. 8
Robert L. Robertson, Dieter K. Zschock, and John A. Daly. 1979, 69p* Rept no. DHEW/PUB/PHS-79-50087

Keywords: Developing countries, Manuals, Guidelines, Public health, Evaluation, Data collection, Developing country application, Health financing, *Health planning, Health care costs.

This manual is number eight in a series of studies known collectively as the International Health Planning Methods Series. The Series provides AID advisors and health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This manual presents an action-tested procedure for appraisal of health sector financing which may be used, with some local adaptations, to examine health sector financial resources. The guidance presented in the text of the manual, combined with the prototype data collection and tabulation arrangement in Appendix A, are sufficiently detailed to lead a host-country health planner or financial specialist through the assessment process. For successful completion of such an evaluation, it is anticipated that a senior-level economist or public finance specialist would be available to assist the analyst, both in initial design and final interpretation of the results.

PB80-179963 PC A06/MF A01
Public Health Service, Rockville, MD. Office of International Health.
A Compendium of Papers on Community Health Planning Issues: Community Health Planning
International Health Planning Methods series no. 9
Paul Ahmed, Aliza Kolker, Susan C. M. Scrimshaw, and Richard H. Hart. 1979, 113p* Rept no. DHEW/PUB/PHS-79-50088

Keywords: Developing countries, Manuals, Public health, Developing country application, *Health planning, Community health services.

This volume consists of a collection of papers dealing with the integration of community health concerns into development planning. It is the ninth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. A recognition and concern for the role of health in development planning was the central theme of a three-day conference on Planning for Health Care in the Context of Economic Development held in San Diego during May 1978. Its purpose was to identify problems and suggest solutions which would encourage and improve planning for health care in the developing countries of the world. The articles in this volume are: Bridging the Health Gap: The Use of Indigenous Resources in Meeting the Manpower Requirements of the WHO Definition of Health; Family Composition and Structure in Relation to Nutrition and Health Problems: Impact and Measurement; Rural Health Reorganization in Tanzania: The Implications of Change Implementation; The Community Health Workers: Guidelines for Training the Community to Power the Program; Critical Environmental and Economic Interdependencies: The Search for Societal Values; Health Sector Assessment; Socio-Cultural Factors in Health Planning Throughout the World; and Psycho-Social and Cultural Aspects of International Health Planning: The Challenge of Providing Health Care Assistance to Developing Countries.

PB80-179971 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
A Compendium of Papers on Health and Economic Development: Health or Wealth
International Health Planning Methods series no. 10
W. Boyd Littrell, Milton I. Roemer, and Paul O. Wooley. 1979, 97p* Rept no. DHEW/PUB/PHS-79-50089

Keywords: Developing countries, Economics, Public health, Manuals, Guidelines, Developing country application, *Health planning, Health care requirements, Health resources.

This volume deals with the delicate relationship between health and economic development, expressed as a choice between health or wealth. It is the tenth volume in a series of works known collectively as the International Health Planning Methods Series. The series provides AID advisors and national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. This volume consists of three articles by recognized experts in the field of international health. The papers are: Health, Income Distribution, and Source of Health Expenditures in Developing Countries; A Systems Perspective on Health and Development; and Needed Development Research for Measuring the Health of Populations in the LDCs. The basic dilemma frequently expressed in the form of the following questions: Is economic development essential for improved health or is improved health required for economic development. These three papers point out that neither alternative is very promising unless supported by reliable assessments of local health needs and resources. A suggested middle path includes identification of specific health sector targets, upon which public spending can be concentrated to make a maximum impact upon overall health improvement.

PB80-181829 PC A04/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
Report to AID on an NBS/AID Workshop on Standardization and Measurement Services
Final rept.
H. Steffan Peiser, Charles C. Raley, and Penelope M. Odar. Apr 80, 67p Rept no. NBSIR-80-2021
Grant PASA/TA(CE)6-71
Report on Workshop Held at Gaithersburg, MD on October 3-21, 1978. For 1977 workshop, see PB-296326.

Keywords: Meetings, *Standardization, Measurement, Standards, Developing countries, Federal assistance programs, International relations.

The object of the Workshop was to give standards officials of industrializing nations insight into the standards and measurement systems of the United States and the role of the National Bureau of Standards, so that these officials might consider what parts of the U.S. system might usefully be adapted to conditions in their home countries. During the Workshop, papers were presented to exchange standardization experience from each participant's country. (These papers were previously published in NBS SP-543, the report on the UNCSTD seminar.) The presentations of the special evening speakers for the Workshop are featured in this report and also a special contribution by the representative from the Arab Organization for Standardization and Metrology. The other participants were from Argentina, Barbados, Brazil, Guyana, India, Indonesia, Jordan, Kenya, Korea, Pakistan, Panama, Saudi Arabia, Sudan, Tanzania, and Tunisia.

PB80-182819 PC A03/MF A01
Utah Water Research Lab., Logan.
Design of a Cost Effective Solar Powered Water Pump
Hydrology and hydraulics series rept.
Duane G. Chadwick. Apr 80, 44p UWRL/H-80/02, OWRT-A-036-UTAH(1)
Contract DI-14-34-0001-8047

Keywords: Vacuum pumps, Design, Cost effectiveness, *Solar water pumps, Solar collectors, Flash boilers.

The design and performance of a vacuum lift, solar powered water pump is discussed. The basic design consists of an expanding gaseous piston confined inside a chamber which is located in series with, and between, an inlet and an outlet check valve. The gas is generated by volatilizing cyclopentane or hexane. Four variations of this basic design concept were built and evaluated. The various features of each are discussed. Considerations in the choice of a cost-effective solar collector are also reviewed. Several of the more promising types of solar collectors were built and evaluated for use on the pump. A 70C heat source temperature is required to operate the pump if cyclopentane is used as the volatile fluid, 90C is required if hexane is used. The volatile fluid is not expended in the pumping process. The pumps constructed on this project have a capacity of approximately 6 liters/minute when pumped to a height of 2 meters. Two square meters of sunshine are sufficient to operate the pump.

PB80-182900 PC A07/MF A01
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Cost of Land Treatment Sytems
Technical rept.
Sherwood C. Reed, Ronald W. Crites, Richard E. Thomas, and Alan B. Hais. Sep 79, 145p* Rept nos. EPA-430/9-75-003-R, EPA/MCD-10-R
Revision of report dated Jun 75.

Keywords: Cost analysis, *Sewage treatment, *Irrigation, Comparison, Design, Water quality, Operations, Maintenance, Fluid infiltration, Benefit cost analysis, Flow rate, Energy, Methodology, *Land use, Land application.

The purpose of this report is to aid the planner and engineer in evaluating monetary costs and benefits of land treatment systems. The three basic modes are slow rate (formerly irrigation), rapid infiltration and overland flow.

PB80-182934 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Africa Health Development Bibliography: Selected References Pertinent to AID Health, Nutrition, and Population Program Development
11 Feb 80, 37p
Contract AID-RSSA-931-0067

Keywords: *Birth control, *Africa, Bibliographies, Health, Nutrition, Family planning, Developing countries, Developing country application, *Health care delivery, Health manpower.

The primary purpose of this Africa Health Development Bibliography is to provide a list of key references useful for USAID to Mission staff involved in health, nutrition, and family planning program development.

This bibliography contains the price and address where 84 books on health in Africa may be obtained. There are 5 citations on appropriate technology; 8 on evaluation; 8 on family planning; 5 on health delivery systems; 6 on health information systems; 8 on health manpower development and training; 10 on health planning and management; 6 on health system financing; 8 on maternal and child health; 6 on nutrition; 7 on tropical and infectious diseases; and 9 on water sanitation. Miscellaneous reports and journals are also listed.

PB80-183569 PC A07/MF A01
Urban Resources Consultants, Washington, DC.
Guidelines for Development of Water/Sanitation Components of Urban Fringe and Rural Village Projects in Developing Countries. Volume I. Patents, Proprietary Processes and Methods Specific to Water Supply, Waste Disposal and Sanitation. Volume II
Bertram Fountain, and Harold Shipman. Dec 79, 132p
Contract AID/DS/OTR-C-0015

Keywords: *Waste disposal, *Water supply, *Sewage treatment, Sewage disposal, Sanitation, Developing countries, Decision making, Safety, Public health, Rural areas, Urban areas, Patents, Reviews, Feasibility, Pipes(Tubes), Pumps, Equipment, Directories, Sewers, Exports, Toilet facilities, Developing country application, Suburban areas, Villages.

This two-volume publication has been prepared to assist those who are responsible for helping poor people gain access to and benefit from a safe water supply and improved sanitation facilities. Vol. 1 is a review of the relevant literature on urban and rural water supplies and sewage systems and of experience in the use of various technologies and methodologies in providing these services. Vol. 2 considers the effective use of patents and proprietary processes and methods and how they might be made more accessible to developing countries.

PB80-183734 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Communicable Diseases Control; Communicable Diseases and Health Planning References
International Health Planning Reference series no. 1
James Chin, and Florence R. Morrison. 1979, 80p
Rept no. DHEW/PUB/PHS-79-50090
Prepared in cooperation with White (E. H.) Co., San Francisco, CA.

Keywords: *Diseases, Bibliographies, Developing countries, Infectious diseases, Abstracts, Reviews, Developing country application, Disease control, State of the art, *Health planning.

This combined literature review and annotated bibliography of 112 references on communicable disease control in developing countries is the first volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume one in the Method series, entitled Communicable Disease Control Planning. The references included here identify works that support and enlarge upon material contained in the basic manual, but the bibliography makes no claim to be an exhaustive or comprehensive listing of available resources. The topics included are: Why plan health programs; Planning methods; Evaluation of health programs; Communicable disease programs; Summary and conclusions; and Annotated Bibliography.

PB80-183742 PC A09/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Environmental Health; Environmental Health References
International Health Planning Reference series no. 2
Renee White Fraser, and Hadasa Shani. 1979, 192p
Rept no. DHEW/PUB/PHS-79-50091

Keywords: Bibliographies, Developing countries, Abstracts, Reviews, Pest control, Air quality, Noise(Sound), Food sanitation, Environmental factors, State of the art, *Health planning, Solid waste disposal, Occupational safety and health, Housing, Developing country application.

This combined literature review and annotated bibliography of 462 references deals with environmental factors in health planning for developing countries. Under this title are grouped concerns for pure water supply, systems for wastewater and excreta disposal; pest control, pesticides, pests, and pest control; radiation; occupational health; air quality; food sanitation; noise; and housing. This is the second volume in a series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and national health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume two in the Methods series, entitled Environmental Health Planning. References included here identify works that support and enlarge upon material contained in the basic manual.

PB80-183759 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Health Manpower Planning; Health Manpower Planning References
International Health Planning Reference series no. 3
Robert J. Staff. 1979, 83p Rept no. DHEW/PUB/PHS-79-50092
Prepared in cooperation with PLOG, Inc., Reseda, CA., and White (E. H.) Co., San Francisco, CA.

Keywords: Bibliographies, Developing countries, Abstracts, Reviews, Developing country application, *Health manpower, *Health planning, State of the art.

This literature review and annotated bibliography of 224 references on health manpower planning for developing countries is the third volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into plans for economic development. This volume is intended primarily as a companion piece to volume three in the Method, series, entitled Health Manpower Planning. References included here are provided to identify works that support and enlarge upon material contained in the basic manual. The bibliography makes no claim to be an exhaustive or comprehensive listing of all available resources. Topic areas include: Assessment of supply behavior; assessment of demand behavior; assessment of balance behavior; and selected references by category.

PB80-183767 PC A05/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Socio-Cultural Factors in Health; Socio-Cultural Factors in Health References
International Health Planning Reference series no. 4
Renee White Fraser, and Hadasa Shani. 1979, 89p
Rept no. DHEW/PUB/PHS-79-50093

Keywords: *Socioeconomic status, Bibliographies, Developing countries, Abstracts, Reviews, Developing country application, State of the art, *Health planning, Sociocultural factors.

This combined literature review and annotated bibliography of 193 references on sociocultural factors in health planning for developing countries is the fourth volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume four, Methods Series: Sociocultural Factors in Health Planning. References included here have been selected to identify works that support and enlarge upon material in the basic manual. This volume is divided into sections on: definitions of health; responses to illness; the interaction of traditional medical systems and modern medicine; and conclusions.

PB80-183775 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies for Pharmaceutical Supply Systems; Pharmaceutical Supply Systems Bibliographies
International Health Planning Reference series no. 5
Leif Schaumann. 1979, 30p Rept no. DHEW/PUB/PHS-79-50094

Keywords: Distribution systems, *Drugs, Bibliographies, Developing countries, Abstracts, Reviews, Rural areas, Low income groups, Developing country application, State of the art, *Health planning.

This annotated bibliography of 110 references deals with pharmaceutical supply systems as they apply to the needs of developing countries. This work is the fifth volume in the six volume International Health Reference Series of manuals and supporting documents which provides AID advisors and health officials in developing countries with critically needed references in health planning. Its primary objective is to identify alternative methodologies for planning and analyzing pharmaceutical supply systems in rural areas of developing countries. A further objective is to review the literature as it pertains to the provision of pharmaceutical services in LDCs, focusing as much as possible on the rural poor.

PB80-183783 PC A04/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Health Facilities Planning; Health Facilities Planning References
International Health Planning Reference series no. 6
Melvin L. Whitfield, and Wendy Graff. 1979, 52p
Rept no. DHEW/PUB/PHS-79-50095

Keywords: Bibliographies, Developing countries, Abstracts, Reviews, Developing country application, Health facilities, *Health planning, State of the art.

This combined literature review and annotated bibliography of 131 references deals with the subject of health facilities planning for developing countries. It is the sixth volume in the series of works known collectively as the International Health Planning Reference Series. The series provides AID advisors and national health officials in developing countries with critically needed references for incorporating health planning into national plans for economic development. This volume is intended primarily as a companion piece to volume five in the Methods series, entitled Health Facilities Planning. References included here are intended to identify works to support and enlarge upon material contained in the basic manual. The bibliography makes no claim to be an exhaustive or comprehensive listing of available resources. It contains a literature review on organization and philosophy of health care systems; assessment and planning; utilization; architecture; and climatic conditions.

PB80-185085 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Guidelines for Analysis of Indigenous and Private Health Care Planning in Developing Countries: Indigenous and Private Health Care Planning
International Health Planning Methods series no. 6
Paul Ahmed. 1979, 50p Rept no. DHEW/PUB/PHS-79-50085

Keywords: Developing countries, Manuals, Guidelines, Assessments, Behavior, Developing country application, *Health planning.

This manual is the sixth volume of the International Health Planning Methods Series. The series provides national health officials in developing countries with critically needed guidelines for incorporating health planning into national plans for economic development. The manual helps health planners assess the importance, extent, and impact of non-public health care in developing countries. This includes individual and familial health care, indigenous practitioners, and private practitioners trained in the Western medical tradition. Guidelines are provided for assessing the indigenous medical systems and private sector health care in: Assessment of use patterns by characteristics of users, circumstances and frequency of use, and types of services used; the meaning and importance of

various available health services to users; assessment of ways of integrating or developing complimentarity between indigenous medicine, the private sector, and public health services.

PB80-186448 PC A06/MF A01
National Technical Information Service, Springfield, VA. Developing Country Staff.
Case Studies Handbook: An Aid to Evaluate the Utilization of Scientific and Technical Information
Francisco J. Pardo de Zela. Oct 79, 107p
Grant PASA-CZ(TAB)-1114-2-77, PASA-CZ(LAR)-0572-1-77

Keywords: Information systems, Developing countries, Utilization, *Technology transfer, National government, *Information services, User needs, Specialized training, Bibliographies, Developing country application, National Technical Information Service.

The handbook contains an elaborated discussion on how to develop case studies describing some of the uses of scientific and technical information in development projects. Suggestions are offered to establish techniques adaptable to the needs and specifications of the reader. Sample case studies are provided on the use of information available through the US AID Network. These resulted from interviews with users in nine participating countries. This handbook can also be used as a reference tool to identify interview candidates from among users of appropriate technology information obtained from the NTIS bibliographic data base.

PB80-187248 PC A02/MF A01
Madras Corp. (India).
Preliminary Project Report on Animal By-Products Utilization
1979, 9p

Keywords: *Waste recycling, Cattle, Animal diseases, Pollution, *India, Byproducts, *Leather, Feeding stuffs, Livestock, Fertilizers, Cost analysis, Project planning, Developing country application, Institutional framework, Recycling.

The city of Madras, India suffered from numerous stray dogs that posed the threat of rabies and the spread of other diseases through the city. To combat this problem and to simultaneously remove the carcasses of larger animals such as cattle and mules, the Municipal Corporation of Madras set up a self-supporting plant to tender the polluting animal carcasses and strays into leather, protein supplement in stock feed, and fertilizer. The report covers the institutional framework, objectives, implementation, and costs of the project.

PB80-187701 PC A05/MF A01
Central Building Research Inst., Roorkee (India).
Building Science Research in India (A Quantitative Study of the Literature)
S. C. Sinha. 1979, 92p
Sponsored in part by Indian National Scientific Documentation Centre, New Delhi.

Keywords: *India, Housing studies, Residential buildings, Research projects, Reviews, Reviewing, Data acquisition, *Housing, *Buildings, Foreign technology.

The primary aim of building science research should be to provide a decent house to each family at reasonable cost. The building research activities lead to original articles published in primary periodicals, papers presented in Conferences and Symposia and research and technical reports. This dissertation attempts to study the contribution of India with the help of 'Building Science Abstracts 1972-1976'. An effort has also been made to see its impact on the world literature through analyzing the data and carrying out a citation, analysis with the aid of 'Science Citation Index 1973-1977'.

PB80-187719 PC A04/MF A01
Tata Energy Research Inst., Bombay (India). Documentation Centre.
Solar Passive Systems for Buildings
Mar 80, 54p

Keywords: *Buildings, Design, Reviewing, Reviews, *Solar heating systems, *Solar cooling systems, Foreign technology, Passive solar heating systems, Passive solar cooling systems, Developing country application.

A survey is provided of what is known about the design of solar passive buildings. A systematic presentation is given of proven concepts with suitable illustrations. It is intended as a general guide for architects, designers and other building practitioners. Topics include the various concepts of solar passive heating and cooling; design factors such as location, climate, microclimate, form; building metabolism; thermal and visual comfort; location and form of illumination; and natural cooling via wind towers and cisterns.

PB80-189285 PC A12/MF A01
Volunteers in Technical Assistance, Inc., Mt. Rainier, MD.
Water Purification, Distribution, and Sewage Disposal for Peace Corps Volunteers
Apr 69, 256p ACTION/PC/RS-29
Contract PC-25-1709

Keywords: *Water supply, *Water treatment, *Sewage disposal, Developing countries, Manuals, Education, Water supply, Distribution systems, Water distribution, Toilet facilities, Construction, Field tests, Public health, Financing, Developing country application, Peace Corps.

This volume aids both the technical instructor as a training manual and the extension worker as a field reference. The volume is divided into instruction units on: Water supply sources; water treatment; planning the distribution system; characteristics of an adequate system; construction techniques; operation and maintenance; the scope of disposal system projects in host communities; the privy method of excreta disposal design for a village; and water carried sewage systems construction and maintenance. Each unit of instruction is sub-divided into an overview; objective; tasks; functional skills; terminal performance tests; related information such as financing; role of the health department, and human factors; and lesson plans. Many illustrations are included.

PB80-190614 PC A09/MF A01
Nebraska Univ., Lincoln. Dept. of Agricultural Engineering.
Irrigation Management - A Mechanism for Saving Energy and Water
Technical completion rept.
Paul E. Fischbach. 1 May 80, 192 OWRT-B-033-NEB(1)
Contract DI-14-31-0001-5137

Keywords: Water conservation, *Irrigation, Design criteria, Soil texture, Efficiency, Fluid infiltration, Soils, Requirements, Scheduling, Nebraska, *Water management.

Research was conducted to determine irrigation management practices on the various soil textures in Nebraska. The basic objective was to design and select irrigation systems to minimize water and energy requirements. To meet this objective, improved irrigation practices were investigated for more efficient use of water and energy resources. Research has indicated that irrigating at maximum non-erosive stream size and automating the furrow irrigation system, one can reduce the irrigation set time and amount of water applied to acceptable levels. This design criteria substantially increases the efficiency of water and energy used. Research has also shown that the selection of various furrow opening and furrow smoothing practices influences the amount of water applied and should be selected according to the soils infiltration characteristics.

PB80-193907 PC A05/MF A01
Asian Inst. of Tech., Bangkok (Thailand).
The Availability of Solar Energy in Thailand
R. H. B. Exell, and Kaya Saricali. Feb 76, 93p Rept no. AIT/RR-63

Keywords: *Solar energy, Insolation, *Thailand, Solar radiation, Distribution, Periodic variations, Diurnal variations, Developing country application.

Meteorological data have been used to produce a comprehensive survey of the solar energy available in Thailand. The results have been presented in a form suitable for use in designing and predicting the performance of solar energy equipment. Geographical, seasonal, and diurnal variations of global solar radiation in Thailand are surveyed. Detailed maps are given of the geographical distribution of solar radiation prepared from data on cloudiness at 44 stations, duration of sunshine at 18 stations, and linear regressions relating radiation to sunshine at Chiang Mai and Bangkok. Rough estimates of diffuse solar radiation and atmospheric turbidity are made from the radiation--sunshine regression parameters. Fluctuations in the daily solar radiation are examined in an unbroken five-year sequence of measurements at Bangkok, and are also estimated from daily sunshine measurements at Bangkok and three other stations in Thailand. The time series of daily totals of global solar radiation at Bangkok is analyzed as a second order random process. The observed annual frequencies of runs of consecutive days with low radiation at Bangkok are given. The diurnal variation of global solar radiation determined from hourly measurements at Chiang Mai and Bangkok is analyzed.

PB80-194046 PC A03/MF A01
Institute for Building Science, Budapest (Hungary).
Choice of Technology at Project Level. Proceedings of the Ad-Hoc Expert Group Meeting on Criteria for the Selection of Appropriate Building Technologies Held at Amman, Jordan on December 10-14, 1977
Emanuel Csorba. 30 Nov 77, 49p

Keywords: *Building materials, *Housing, Construction industry, Buildings, Construction materials, Technology assessment, Perlite, Calcium oxides, Concrete blocks, Prefabrication, Floors, Developing country application.

This paper views the building as an integrated product of various technologies. It discusses flow diagram and hierarchy of building technologies, main factors to be considered when choosing appropriate technologies for building materials industries and for construction activities at project level. Emphasized are building materials production technologies; prefabricated building units production technologies; prefabricated load-bearing structure production technologies; complementary building structures prefabrication technologies; and rationalized monolithic technologies.

PB80-194954 PC A02/MF A01
Structural Engineering Research Centre, Roorkee (India)
Small Capacity Ferrocement Bins
1977, 19p

Keywords: *Grains(Food), *Food storage, *India, Bins, Rural areas, Insects, Durability, Maintenance, Rodents, Hazards, Cost analysis, Developing country application, Graineries, *Ferrocement.

Improper methods of storage adopted at present are estimated to account for a loss of about 11 million tons of grain, representing about 10% of the total annual produce. With 70% of the grain stored in villages, the answer is to develop and promote scientific and inexpensive methods of storage at the rural level. This booklet presents complete instructions on how to make rodent and insect proof grain storage bins that are relatively inexpensive to make and easy to repair. The bins can also be coated with bituminous paint and used as water tanks. From the point of view of long term durability, minimum maintenance and special treatment against rodent attack and fire hazard, ferrocement bins are economical when compared to other types of bins.

PB80-195365 PC A03/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Marketing and Purchasing Div.
Small Fresh Fruit and Vegetable Cooperative Operations
Cooperative information rept.
Fred E. Hulse, Gilbert W. Biggs, and Roger A. Wissman. Jun 80, 35p Rept no. CIR-27

Keywords: *Vegetables, *Fruits, Sales management, Marketing, Sales, Organization theory, Financial management, Agricultural economics, Management methods, *Cooperatives, *Small businesses.

Thirty-four small fruit and vegetable cooperatives using different sales methods -- auctions, sales agencies, and their own sales staffs -- varied importantly in number and type of services provided, production and marketing supplies handled, grower payment meth-

ods, grower marketing agreements, and financing methods used. Their operating problems and causes for the demise of four cooperative operations are reviewed. A set of guidelines directed to the organization and operation needs of small fruit and vegetable cooperatives is included.

PB80-195381 PC A03/MF A01
California Univ., Berkeley. Sea Water Conversion Lab.
How to Build a Solar Still
Lee Edson, Horace McCracken, and James Weldy.
15 Jun 66, 27p

Keywords: Desalting, Design, Sea water, Construction materials, Performance evaluation, Potable water, *Desalination, *Solar energy, Solar stills, Developing country application.

Directions for the construction of an inexpensive solar still for utilizing the sun's energy to convert salt water to fresh are presented. Information is given on the materials needed, directions for the use of the still, and expected production rates. This solar still can be built from materials available in most lumber yards, metal-supply houses, and plastic-supply stores. Illustrations are provided for use in the construction of the still.

PB80-195951 PC A11/MF A01
Kasetsart Univ., Bangkok (Thailand). Inst. of Food Research and Product Development.
Selected Papers on Protein Food Promotion. Volume I: Nutrition and Protein. Strategies to Improve the Diet of the Poor
G. D. Kapsiotis, G. F. Combs, and F. W. Hill. 1970, 247p

Keywords: Nutrition, *Food processing, *Proteins, Nutritional deficiency diseases, Income, Government, Fortifications, Developing country application.

The broader issues of nutrition research, combatting malnutrition, the effect of income on nutrition, and the role of government in nutritional efforts are presented in this volume of nineteen papers. The papers were presented at a seminar November 22-December 1, 1970 at Kasetsart University in Thailand.

PB80-195969 PC A11/MF A01
Kasetsart Univ., Bangkok (Thailand). Inst. of Food Research and Product Development.
Selected Papers on Protein Food Promotion. Volume II: Food Processing and Protein Fortification
F. E. Horan, Hans-Dieter Payer, and Vichitr Benjasil.
1970, 241p

Keywords: Nutrition, *Food processing, *Proteins, Nutritional deficiency diseases, Income, Government, Fortifications, Developing country application.

The volume contains fourteen papers presented at a seminar November 22-December 1, 1970 at Kasetsart University in Thailand. The papers address the issues of nutrition research, combating malnutrition, the effect of income on nutrition, and the role of government in nutritional efforts.

PB80-196116 PC A08/MF A01
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
The Role of Plastic Pipe in Community Water Supplies in Developing Countries
Frederick E. McJunkin, and Charles S. Pineo. 1971, 175p
Contract AID/csd-1688

Keywords: *Water supply, Plastic pipes, Piping systems, Manufacturing, Standards, Developing countries, Market surveys, *Plastics, *Pipes(Tubes), Developing country application.

Pipe is a major cost element of community and household water systems. In the most common diameters pipe made of plastics is competitive in cost and performance, and in many circumstances, costs less than pipe of other material. Plastic pressure pipe can be readily manufactured in developing countries with a minimum of hard-currency investment, skilled labor relative to other forms of pipe, and expenditure for imported materials, relative to production of other pipe. The intent of this report was to prepare a document which would enable engineers, administrators, public officials, industrialists, development personnel, the international banks, and others to review the role of plastic pipe in community water supply in developing countries, and to provide a resource document to support further technical or administrative action. Extensive use has been made of specialized appendices. The subject areas include the use of plastic pipe; plastic pipe standards and codes; manufacture of plastic pipe; and the market for plastic pipe. Appendices cover the topics of abbreviations; bibliography; standards and specifications for plastic pipes; a glossary of plastic piping terms; directory of manufacturers; installation of plastic pipe; and plastic pipe for sewers.

PB80-197098 PC A04/MF A01
Fiat Centro Ricerche, Turin (Italy).
Potential of Diesel Engines, Fuels and Lubrication Technology
Final rept.
Giorgio Cornetti. Mar 80, 62p DOT-HS-805-241
Contract DOT-TSC-1424

Keywords: *Automobiles, *Diesel engines, Diesel fuels, *Lubrication, Fuel consumption, Fuel additives, Substitutes.

The chemical and physical properties of diesel fuel are reviewed along with their relationships to the fuel economy and emissions of diesel powered automobiles and light trucks. The fuels considered include both conventional and alternative diesel fuels. Additives are surveyed and their impacts on combustion and overall engine performance are discussed. The fuel economy potential of future lubricants is investigated, particularly (1) upgraded mineral oils, (2) synthetic oils, and (3) colloidal suspension in mineral oils.

PB80-197866 PC A03/MF A01
Indian Agricultural Research Inst., New Delhi.
Contributions to a Changing Agriculture (IARI Annual Report, 1977)
1979, 166p

Keywords: *Agriculture, *India, Yield, Food, Production, Research projects, Farm crops, Technology transfer, Wheat plants, Barley plants, Grain sorghum plants, Rice plants, Oilseed crops, Cotton plants, Arid land, Planting, Cultivation, Developing country application.

Indian agriculture continues to be in early stages of its transformation from subsistence to modern with emphasis on high levels of yield. Already some progress has been made in increasing food production, but much remains to be done to accelerate the change. A key role in this process of transformation is being played by new crop varieties and their associated production technology. This report describes studies undertaken at the Institute that are helping to generate new production technologies. Topics include production technologies for wheat, barley, maize, sorghum, pearl millet, rice, pulses, oilseeds, and cotton; multiple and intercropping systems; dryland cropping; various mission-oriented research projects; evolving new techniques.

PB80-197874 PC A02/MF A01
Petroleum Conservation Research Association, New Delhi (India).
Use of Ethanol from Sugar Molasses as a Blending Component in Gasoline
1979, 20p

Keywords: Fuels, *Sugarcane, *Molasses, Ethyl alcohol, Gasoline, Blends, Mixtures, Foreign countries, *India, *Gasohol, Synthetic fuels.

This paper analyzes the possibilities and the various issues involved in the use of ethyl alcohol from sugar molasses as a blend component in gasoline in India.

PB80-197882 PC A03/MF A01
Petroleum Conservation Research Association, New Delhi (India).
Replacement of Inefficient Boilers by Modern Package Boilers for Fuel Economy
1979, 33p

Keywords: *Boilers, Fuel consumption, Replacing, *India, *Industrial plants, Foreign technology, Fuel economy, *Energy conservation.

A survey has revealed that a saving of 10% to 20% in fuel oil consumption, in the majority of India's industrial boiler installations, could be realized through replacement of existing boilers with modern package boilers. An assessment is made of the investment needs and savings potential for modernization of oil fired boilers throughout the country. Constraints inhibiting modernization are identified and remedial measures are suggested.

PB80-197890 PC A02/MF A01
Petroleum Conservation Research Association, New Delhi (India).
Educational Campaign for Petroleum and Fuel Conservation
1979, 25p

Keywords: Communications management, Publicity, *Education, Fuels, Foreign countries, *India, *Energy conservation, Developing country application, Petroleum.

The report discusses the desirability of and strategies for a campaign to encourage conservation among individual consumers of petroleum products in India. Topics covered include the potential for conservation in the unorganized consumers sector; selection of suitable messages; selection of media for the campaign; costs of achieving a desired coverage and ways of minimizing these costs; ensuring maximum effectiveness; efforts in various other countries.

PB80-197908 PC A03/MF A01
Petroleum Conservation Research Association, New Delhi (India).
Operation Diesel Conservation Upgradation of Driving and Maintenance Skills
1978, 28p

Keywords: Specialized training, Motor vehicle operators, *Diesel engines, Abilities, Performance, Foreign countries, India, Maintenance, Schools, Licenses, *Training, *Energy conservation.

A plan is presented which outlines major alternatives for upgrading the skills of diesel vehicle operators and mechanics in India. The primary objective is to realize savings in fuel consumption.

PB80-198492 PC A15/MF A01
National Environmental Engineering Research Inst., Nagpur (India).
Research Programmes in Environmental Engineering and Science in India
B. B. Sundaresan, S. K. Kesarwani, and S. G. Bhat.
1978, 327p

Keywords: Research project, *India, Water, Sewage, Industrial wastes, Air pollution, Noise pollution, Pesticides, Radioactive wastes, Abstracts, Foreign countries, *Research and development, *Environmental management, Solid wastes, Listings.

This publication provides information about the ongoing research projects in the field of Environmental Engineering and Science in India. It contains information on 462 research projects carried out by about 893 scientists working in different organizations.

PB80-198914 PC A03/MF A01
Leet and Leet Consultants, New York.
The Trickle Up Program in the Caribbean
Glen Leet, and Mildred Robbins Leet. c1980, 38p

Keywords: *Employment, Developing countries, Incentives, Productivity, Financing, Females, Community development, Income, *Caribbean, Developing country application.

The study reports on the progress of the trickle-up program in its first one and one half years. Under the trickle-up program incentive awards of US $100 each will be made to groups of five or more people who agree to invest 1,000 or more hours of their unemployed time on approved projects that: (1) they have planned themselves; (2) for which they have or can secure any needed approvals, technical aids, and/or other resources; (3) where the 1,000 hours of self-employment can be completed within three months; (4) where a profit is anticipated; (5) where not less than 20% of the profits will be reinvested for continuation of the project

activity, or for other projects planned by the group; (6) where continuing and expanding levels of self-employment are anticipated; and (7) for which reports on activity and results will be provided. The success of the program in the Caribbean make it worth considering for development programs elsewhere.

PB80-199441 PC A06/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
NBS/AID/PCSIR (Pakistan Council of Scientific and Industrial Research) Survey on Standardization and Measurement Services in Pakistan
Final rept.
H. Steffen Peiser, Thoodore M. Manakas, and Penelope M. Odar. Jun 80, 116p Rept no. NBSIR-80-2051
Grant PASA-TA(CE)-5-71

Keywords: *Standardization, Measurement, *Pakistan, Standards, Temperature, Surveys, Meteorology, Units of measurement, Corporations, Technological intelligence, Weights and measures.

Following similar projects conducted by the National Bureau of Standards in other countries, the Ministry of Science and Technology of Pakistan and under it the Pakistan Council of Scientific and Industrial Research invited NBS to organize a six-man international team of experts in selected topics of metrology to advise on the adequacy and needs for standards and measurement services and to comment upon the plan to establish a new laboratory in Islamabad which would be the primary national standards body under the title of National Physical and Standards Laboratory. The team strongly endorsed the NPSL plan, having found every indication that a national focal point for good measurements appeared as a critical need for Pakistan's development. A summarizing letter of conclusions and recommendations is reproduced with other recommendations and relative remarks by visiting team members (Section III). For readers not familiar with Pakistan, Sections V and VI give some background on science and technology in Pakistan.

PB80-199987 PC A08/MF A01
Stanford Univ., CA. Inst. for Communication Research.
The Role of the Telephone in Economic Development
Technical rept.
Andrew Peter Hardy. Jan 80, 153p
Contract AID/ta-C-1472

Keywords: Economic development, *Telephone systems, Telecommunications, Developing countries, Mass media, Foreign countries, Gross National Product, Time series analysis, Regression analysis, Economic impact, Social effect, Social organization, Developing country application.

The study is concerned with the role which telecommunications, and more specifically the telephone, plays in economic development. The study tests whether the telephone contributes to economic development, and how it makes this contribution. Indicators of economic development, the telephone, and mass media were used in a pooled, cross-sectional time-series regression analysis.

PB80-200546 PC A99/MF E02
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Process Design Manual for Sludge Treatment and Disposal
Technology transfer series.
Sep 79, 1135p* Rept no. EPA-625/1-79-011

Keywords: *Sewage treatment, Sludge, *Water pollution, Manuals, Reviews, Processing, Operations, Design, Municipalities, Waste water, Sludge disposal, Technology transfer, Optimization, Flow charting, *Water treatment, Sewage treatment plants, Sludge treatment.

The purpose of this manual is to provide the engineering community and related industry with a new source of information to be used in the planning, design, and operation of present and future wastewater pollution control facilities. This manual supplements this existing knowledge by describing new treatment methods and by discussing the application of new techniques for more effectively removing a broad spectrum of contaminants from wastewater.

PB80-202450 PC A02/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Determining Fixed and Operating Costs of Logging Equipment
Forest Service general technical rept. (Final)
Edwin S. Miyata. Jul 80, 24p Rept no. FSGTR-NC-55

Keywords: Wooden logs, Lumbering, Equipment, Harvesting, Cost analysis, Estimating, Market value, *Wood, Salvage, Depreciation, Investments, Taxes, Maintenance, *Industrial plants.

The report describes and analyzes all elements of equipment cost and gives a procedure for estimating them.

PB80-202518 PC A13/MF A01
Catalytic, Inc., Philadelphia, PA.
Desalting Handbook for Planners (Second Edition)
Sep 79, 299p* W80-06013
Contract DI-14-34-0001-8701
Also pub. as OWRT-8701(1).

Keywords: Desalting, *Industrial plants, Handbooks, Technology, Cost analysis, Economic analysis, Distillation, Evaporation, State government, National government, Environmental impacts, Plant location, Ion exchanging, Performance evaluation, Scaling, Design, Electrodialysis, Membranes, Construction costs, Brines, Brackish water, Operating costs, Capitalized costs, *Desalination, Vacuum freeze vapor compression desalination, Verticle tube evaporation, Multistage flash distillation, Reverse osmosis desalination, Water quality, Vapor compression distillation.

This revised Handbook has extensive updating of text material and cost curves, primarily resulting from the most currently published literature from the Office of Water Research and Technology (OWRT). All chapters of this Handbook have been comprehensively revised to reflect latest technology and most recent costing information available to the desalting field. Major sources of data are referenced in the Handbook. Data together with background information and input from OWRT is compiled in a form suitable for water planner's use. The Handbook has been prepared for use in preliminary planning as a source of up-to-date information on the state of development, costs, economics, and applicability of those desalting processes which are available for providing water supply. It is anticipated that the Handbook will fill a particular need in conducting Western U.S. Water Plan Studies. The Handbook is not meant to substitute for the thorough engineering and economic analysis that should precede the decision to build a desalting plant.

PB80-203128 PC A19/MF A01
National Training and Operational Technology Center, Cincinnati, OH.
Methods for the Determination of Chemical Contaminants in Drinking Water - Participants Handbook
Training manual.
Mar 80, 439p* Rept no. EPA-430/1-80-006

Keywords: Potable water, Water analysis, Manuals, Instructional materials, Chemical analysis, Education, Metals, Silver, Codmium, Chromium, Lead(Metal), Mercury(Metal), Arsenic, Regulations, Laboratory equipment, Herbicides, Pesticides, Turbidity, Selenium, Inorganic nitrates, Fluorides, Barium, Chlorine, *Water quality, *Water pollution, Drinking water.

This laboratory manual is designed to contain analytical procedures for all parameters listed in the National Interim Primary Drinking Water Regulations (NIPDWR). Some procedures may be carried out by operators or laboratory technicians with little or no experience (chlorine, turbidity, fluoride, nitrate) while other parameters require understanding and experience in using sophisticated analytical equipment (atomic absorption, gas chromatography). Parameters included are procedures for silver, cadmium, chromium, lead, mercury, arsenic, selenium, nitrate, fluoride, barium, chlorine, turbidity, pesticides, herbicides. It is written in a step-by-step format.

PB80-205188 PC A07/MF A01
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Water Quality Control and Management of Animal Wastes Through Culture with Selected Fishes
Final rept.
D. Homer Buck, and Richard J. Baur. Apr 80, 130p
UILU-WRC-80-0151, OWRT-A-083-ILL(4)
Contract DI-14-34-001-8015
Prepared in cooperation with Illinois Natural History Survey, Urbana.

Keywords: Carp, *Agricultural wastes, Livestock, *Water pollution, Organic wastes, Plankton, Bacteria, Feces, Food processing, Ponds, Feeding stuffs, *Water quality, *Fishes, *Animal wastes, Hypophthalmichthys molitrix, Aristichthys nobilis, Ctenopharyngodon idella, Cyprinus carpio.

This study evaluated the contributions of four Chinese carps to the biological treatment of organically polluted waters. Results established that through consumption of large quantities of organic matter, both living (plankton, bacteria) and dead (detritus, feces), the four carps in proper densities can signficiantly improve the quality of organically polluted waters and that properly designed systems would have practical application for small communities, livestock producers, and food processors. Four Chinese carps were added to the four oxidation ponds receiving swine wastes.

PB80-207251 PC A02/MF A01
Syracuse Research Corp., NY. Energy Research Center.
Building a Library for Energy and Appropriate Technology
Lawrence J. Reynolds. Dec 79, 22p SRC-TR-77-555.27, CSA-LN-2593
Grant CSA-30200-L-76-01

Keywords: Information systems, *Libraries, Documents, Elderly persons, Low income groups, *Energy conservation, Listings, *Appropriate technology.

The report is one in a series of bulletins to provide technical assistance to administrators of programs to weatherize the homes of poor persons.

PB80-207772 PC A12/MF A01
New York State Energy Research and Development Authority, Albany.
Small Hydroelectric Project Manual for Appalachian New York
Mar 80, 259 ARC-78-202/CO-6520
Grant ARC-78-202/CO-6520
Prepared in cooperation with Gibbs and Hill, Inc., New York.

Keywords: New York, *Hydroelectric power, Feasibility, Head(Fluid mechanics), Manuals, Economic analysis, Assessments, Low head hydroelectric power plants.

A major New York State energy goal is reducing dependence on expensive, imported oil. Throughout the Appalachian Region of New York State there are existing dam sites that have potential for development as small/low-head hydroelectric generating plants. These hydroelectric sites include those with abandoned generating facilities as well as those which were constructed for purposes such as flood control, navigation, and water storage. To encourage and assist efforts to develop these sites, this manual has been prepared to help identify those sites that have potential for hydroelectric power generation and to provide guidelines for the performance of preliminary feasibility assessments of the sites. The manual guidelines will assist municipal officials, planners, and others who do not have hydroelectrical engineering backgrounds in estimating the generating capacities and approximate power generating costs of small hydroelectric power installations. Legal, regulatory, and institutional issues affecting small hydroelectric power facilities have also been identified, and discussions of various approaches to these problems are included.

PB80-221757 PC A09/MF A01
Forest Products Lab., Madison, WI.
Forestry Activities and Deforestation Problems in Developing Countries
John I. Zerbe, Jacob L. Whitmore, Harold E. Wahlgren, James F. Laundrie, and Kjell A. Christophersen. Jun 80, 199p*
Grant PASA-AG(TAB)-1080-10-78

Keywords: *Forestry, Developing countries, Afforestation, Ecology, Constraints, Project planning, Inven-

tories, Assessments, Education, *Environmental impacts, Developing country application, Deforestation.

This report summarizes recently completed, current, and proposed forestry activities in LDC's. Included are ecological impacts of these activities, constraints in implementation of projects, and some examples of success and failure to be used to design a strategy to deal with LDC deforestaton problems. Specific objectives were to provide: An inventory and assessment of the ecological impact of the forest-related activities of the major donors assisting LDC's; an assessment of the constraints on donors dealing with forestry and deforestation; an inventory showing the most critical obstacles of opportunities of the forestry problems of LDC's and which of these to address through research, pilot projects training, or other means; and selected case studies.

PB80-223050 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Treatability Manual. Volume I: Treatability Data
Jul 80, 1035p Rept no. EPA-600/8-80-042A
Also available in set of 5 reports PC E99, PB80-223043.

Keywords: *Waste water, *Water pollution, Manuals, Inorganic compounds, Metals, Ethers, Phthalates, Nitrogen, Aromatic compounds, Hydrocarbons, Biphenyl, Chlorine organic compounds, Halohydrocarbon, Phenols, Polycyclic compounds, Pesticides, Oxygen, *Water treatment, *Waste water reuse.

Volume I is a compendium of treatability data for specific compounds. Volume I of the Treatability Manual supplies data on specific compounds. It is intended to provide facile reference to physical data on the pollutants, their occurrence patterns, and methods of treatment and/or removal.

PB80-223068 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Treatability Manual. Volume II: Industrial Descriptions
Jul 80, 978p Rept no. EPA-600/8-80-042B
Also available in set of 5 reports PC E99, PB80-223043.

Keywords: *Waste water, Industrial waste treatment, *Water pollution, Standard, Electric power plants, Wood, Textiles, Paints, Metals, Wood pulp, Leather, Copper, Mineral ores, Explosives, Plastics, Machinery, Adhesive, Iron and steel industry, Inorganic compounds, Coal mining, Electroplating, Automobiles, *Waste water reuse, *Water treatment.

Volume II of the Treatability Manual provides generic process descriptions for the industrial categories listed. The objective of this volume is to characterize the wastewaters discharged on a facility by facility basis, prior to treatment and after treatment. The pollution control methods used with the treated final effluent pollutant concentrations are also provided.

PB80-223076 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Treatability Manual. Volume III: Technologies for Control/Removal of Pollutants
Jul 80, 730p Rept no. EPA-600/8-80-042C
Also available in set of 5 reports PC E99, PB80-223043.

Keywords: *Waste water, *Water pollution, Manuals, Screening, Gravity, Separation, Clarification, Flotation, Filtration, Lagoons(Ponds), Activated sludge process, Activated carbon treatment, Nitrification, Electrodialysis, Ozone, Chlorination, Osmosis, Trickling filters, *Water treatment, *Waste water reuse, Rotating disc process, Denitrification, Reverse osmosis.

This volume presents performance data and related technical information for 56 unit operations used in industrial water pollution control. These 56 unit operations include 24 sludge treatment and disposal technologies and 32 generic wastewater treatment technologies classified as preliminary, primary, secondary, or tertiary treatment. Section 2 discusses the rationale used to segregate the 32 wastewater treatment technologies into four classifications.

PB80-223084 PC **A18**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Treatability Manual. Volume IV: Cost Estimating
Jul 80, 403p Rept no. EPA-600/8-80-042D
Also available in set of 5 reports PC E99, PB80-223043.

Keywords: *Waste water, *Water pollution, Manuals, Cost estimates, Industrial waste treatment, Municipalities, Licenses, Law enforcement, Personnel, *Waste water reuse, *Water treatment.

The objective of the treatability program are: To provide readily accessible data and information on treatability of industrial and municipal waste streams for use by NPDES permit writers, enforcement personnel, and by industrial or municipal permit holders; To provide a basis for research planning by identifying gaps in knowledge of the treatability of certain pollutants and wastestreams; To set up a system allowing rapid response to program office requirements for generation of treatability data.

PB80-223092 PC **A09**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Treatability Manual. Volume V: Summary
Jul 80, 178p Rept no. EPA-600/8-80-042E
Also available in set of 5 reports PC E99, PB80-223043.

Keywords: *Waste water, *Water pollution, Manuals, Cost analysis, Feasibility, Waste disposal, Effectiveness, *Waste water reuse, Control equipment, Sludge disposal, Bibliographies, *Water treatment.

The Treatability Manual presents in five volumes an extensive survey of the effectiveness of various water pollution treatment processes when applied to particular industrial effluents. This volume summarizes volumes one through four and outlines their potential utility to National Pollutant Discharge Elimination System (NPDES) permit writers.

PB80-224017 PC **A07**/MF **A01**
Building Research Station, Watford (England).
Roofs for Warm Climates
R. Sperling. 1979, 141p

Keywords: Roofs, Tropical regions, Design, Durability, Construction materials, *Houses, Insulation, Waterproofing, Ceilings, Foreign technology, Developing country application.

This publication is an attempt to deal with the problem, as it concerns the roof, which is perhaps the most important component of all, influencing to a considerable extent the design and construction of the rest of the building. The requirements of flat roofs are considered in this volume, and it is anticipated that later ones will be concerned with pitched roofs. This survey should assist architects and builders in their efforts to improve the general standard of roof construction in warm climate and to develop suitable forms of construction.

PB80-224173 PC **A07**/MF **A01**
International Children's Centre, Paris (France).
Information on Early Childhood
Final rept.
Jun 80, 130p
Grant DHHS-ACYF-90-C-1801

Keywords: *Children, Accident prevention, Immunization, Stimulation, Trends, Parents, Developing countries, *Health, Infants, Benefits, Breast feeding, *Health education, Maternal and child health services, Mothers, Training.

The report is a set of documents on breast-feeding, immunization, prevention of childhood accidents, and early stimulation of infants and children. It contains information addressed to (1) policy makers; (2) academicians; (3) practitioners; and (4) mass media specialists in French, English and Spanish. The essential information includes: the biological value and benefits of mother's milk; the arguments for breast-feeding; and data on trends in breast-feeding for both developing and industrialized countries. The document contains information on programs to educate health personnel and mothers on the best methods of breast-feeding and includes suggestions for a training curriculum. For policy, suggestions are made about legislation, working mothers, maternity leave, maternal and child health care, and other economic and social measures. Public information is central to changing policies. Charts and bibliography are included. The set is one of ten addressing issues and concerns of children, and may be used for further translation and adaptation for local use for both developing and industrialized countries. Requests for additional information may be directed to the International Children's Center.

PB80-226145 PC **A05**/MF **A01**
Foras Forbartha, Dublin (Ireland).
Sand Dunes: Formation, Erosion and Management
Ann C. M. Quinn. Dec 77, 98p Rept no. ISBN-0-900115-91-2

Keywords: *Soil erosion, Dunes, Ireland, Sands, Management, Coasts, History, Conservation, Restoration, Soil properties, Recreation, Maps, Geologic processes, Vegetation, Drift, Coastal topographic features.

Sand dunes are a specific and valuable element of the coastline and they deserve special attention as a hitherto largely neglected national asset. This handbook will prove useful to those authorities concerned with the management of this important resource.

PB80-227424 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Preservative Treatments for Constructional Timber
Current papers
R. Cockcroft. c1977, 13p Rept no. CP-17/77

Keywords: Construction materials, *Wood, Preserving, *Wood preservatives, Fungus proofing, Timber construction, Durability, Foreign technology.

The paper argues that there is a good economic case for considering wood preservation at the design stage when using constructional timber. It explains when preservation is necessary and defines four hazard categories which have been adopted in the new British Standard BS 5268: Part 5:1977. The questions of how long untreated timber lasts, how it may be preserved and which wood preservatives and methods of treatment are available are dealt with in detail. (Copyright (c) British Crown Copyright.)

PB80-227929 PC **A06**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Cycling as a Mode of Transport
c1980, 116p Rept no. TRRL-SUPPLEMENTARY-540
Proceedings of a Symposium Held at Crowthorne, England on 25 October 1978. Prepared in cooperation with the Institution of Highway Engineers.

Keywords: *Bicycles, *Transportation, Meetings, Route surveys, Traffic safety, Vehicular traffic control, Paths, Design criteria, Foreign technology, Bikeways, Bicycle lanes, Bicycle safety.

Contents: Cyclists' touring club centenary; Cycle use in Britain; Cycle safety; Legal aspects; Design criteria; Cycle routes in the Hague and Tilburg; Bikeway demonstration program -- an overview; Cycle routes in Peterborough. (Copyright (c) Crown Copyright 1980.)

PB81-101875 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Basements in Housing: A Feasibility Study
Current papers
S. A. Covington. c1978, 15p Rept no. CP-4/78

Keywords: Residential buildings, Basements, Structural design, Cost comparison, Slopes, *Buildings, *Houses, Foreign technology.

A study has been made of the feasibility of providing habitable basements in housing. In the study, alternative methods of constructing basements were examined, basement house plans were developed and a comparison was made, on a cost and amenity basis, of basement houses and comparable non-basement houses. It is shown that, in general, basement houses are more expensive on both flat and sloping sites than the nearest comparable non-basement houses. When measured as cost per unit of 'useful shell area' (i.e. the

floor area excluding circulation areas and garage) the basement house is 22 percent to 28 percent more expensive on flat sites and 8 percent to 11 percent more on sloping sites. However, the notional plot area required for basement houses is less, giving scope for higher densities of development and reduced land costs. (Copyright (c) British Crown Copyright.)

PB81-101933 PC E02/MF E02
Fire Research Station, Borehamwood (England).
A Cost-Benefit Analysis Applied to Foamed Plastics Ceilings
Current papers
I. C. Appleton. c1977, 13p Rept no CP-50/77

Keywords: *Buildings, Ceilings(Architecture), Structural plastics, Fires, Foam laminated fabrics, Polyurethane resins, Benefit cost analysis, Fire resistance, *Foam plastics, *Cost benefits, Foreign technology.

A few fires in recent years, in particular two fires in Ashford, Kent in 1973 and 1975, have led to much controversy over the use of foamed plastics as a building material and it has been proposed that such materials be replaced by some more traditional materials, e.g. plasterboard. The cost of such action would be significant. A cost-benefit analysis has been applied to this particular problem. The objective is not to favor one answer or another, but rather to provide the policy makers with the necessary data to assist them in making a rational decision. (Copyright (c) British Crown Copyright.)

PB81-103103 PC A02/MF A01
Auburn Univ., AL. Dept. of Botany, Plant Pathology, and Microbiology.
Effects of Herbicides on Submerged Seed Plants
Completion rept. 1 Oct 78-30 Sep 80
Donald E. Davis. 15 Sep 80, 23p OWRT-A-067-ALA(2)
Contract DI-14-34-0001-0101

Keywords: *Herbicides, *Plants(Botany), *Aquatic plants, Concentration(Composition), *Aquatic plant control, Seeds, Toxicity, Chlorine organic compounds, Nitrogen heterocyclic compounds, Amines, Glycine, Water pollution effects(Plants), Atrazine, Elodea canadensis, Myriophyllum spicatum, Vallisneria americana, Glyphosate, Metribuzin.

The effect of various concentrations of three herbicides on underwater seed plants was investigated. The herbicides used were atrazine, glyphosate, and metribuzin. The plants exposed to one or more of these herbicides were elodea (Elodea canadensis), wild-celery or vallisneria (Vallisneria americana), redhead grass (Potamogeton perfoliatus), Eurasian watermilfoil (Myriophyllum spicatum), egeria (Egeria densa), fanwort or cabomba (Cabomba carolininiana), and milfoil (Myriophyllum sp.).

PB81-103756 PC A07/MF A01
National Environmental Engineering Research Inst., Nagpur (India).
Water and Waste Water Analysis: A Course Manual
1979, 149

Keywords: Water analysis, *Water pollution, Developing countries, Collecting methods, Manuals, Biochemical oxygen demand, Equipment, Spectrophotometers, Digestion(Decomposition), Flame photometry, Anaerobic processes, *Waste water.

Water and wastewater analyses have become increasingly important in water quality monitoring. Analytical techniques adopted should be precise and accurate. The methods should take into consideration the limitations in developing country situations. The study describes the analytical techniques.

PB81-103772 PC A03/MF A01
National Environmental Engineering Research Inst., Nagpur (India).
Sanitation Facilities for Slums and Rural Areas
V. Raman. Dec 75, 28p

Keywords: Sanitation, Facilities, *India, Foreign countries, *Waste disposal, *Water treatment, Public health, Rural areas, Central city, Hygiene, *Sanitaryware, Foreign technology.

Urban slums and rural areas present a dismal picture in respect of environmental sanitation. NEERI is seized with this problem and engaged in devising ways and means to ameliorate the situation. The means to achieve this have got to be necessarily simple, easy to operate and well within the reach of a household. This brochure presents typical designs of sanitation facilities. It is hoped that the brochure will serve as a guide to Government Departments, local bodies and individuals for successful implementation of the sanitation program. Even though such schemes might not be remunerative on their value, the improved living conditions will indirectly reflect on increased productivity. Moreover, such a program forms a social responsibility to communities.

PB81-103988 PC A07/MF A01
Mountain Bicyclists' Association, Inc., Denver, CO.
Bicycle Transportation for Energy Conservation
Final technical rept. Jun 79-May 80
Katie Moran. May 80, 138p DOT/P-80-092
Contract DOT-OS-90092

Keywords: *Bicycles, *Transportation, Utilization, Constraints, Project planning, *Energy conservation, Commuter transportation, National Energy Conservation Policy Act of 1978.

The study was mandated by Section 682 of the National Energy Conservation Policy Act of 1978. The study's objectives were to: (1) identify the obstacles to increased bicycle use; (2) develop a Comprehensive Bicycle Transportation Program (CBTP) to overcome these obstacles; (3) establish a target goal for bicycle commuting; and (4) determine the energy conservation of potential bicycle transportation.

PB81-104002 PC A03/MF A01
Society for Advanced Medical Systems, Chevy Chase, MD.
Instructor's Manual for Allied Health Apprenticeship Training
Jul 80, 41p
Grant DL-20-24-79-44

Keywords: Apprenticeship, Instructional materials, Public health, Students, Nurses, Training devices, Job description, Orientation(Training), Specialized training, Manuals, *Health education, Allied health personnel.

Under a research contract from the U.S. Department of Labor's Office of Research and Development, the Society for Advanced Medical Systems (SAMS) has developed an Instructor's Manual for Allied Health Apprenticeship Training. The instructor's manual is part of the first phase of a demonstration project of performance-based career development in Allied Health Care Apprenticeship training. Instructors in Allied Health Care Apprenticeship training will find the manual useful in identifying the best methods of instruction, in determining the objectives of the instruction in ways that leave no opportunity for misunderstanding, in evaluating the apprentices' progress, and in diagnosing any barriers to learning that may occur.

PB81-105678 PC A04/MF A01
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Farmers' Access to Markets
Staff rept.
Allen B. Paul, Robert W. Bohall, and Gerald E. Plato. Sep 80, 61p Rept no. AGESCS-800926

Keywords: *Marketing, Agricultural products, Farms, Commerce, Sales management, *Agricultural economics, Fruits, Vegetables, Dairy products, Eggs, Corn, Cattle, Poultry, Cotton fibers, Beef cattle, Government policies, Cooperatives, Future trading, Hogs.

Many forces in the modern industrial age interact to make farmer access to buyers more difficult. The nature and dimensions of the problems do not remain the same under the continuous march of technology, changing market requirements, changing business practices, and evolving government policies. Farms of all sizes are caught up in the need to adjust their lines of production and modes of selling. Smaller farms usually have the harder time taking advantage of economies of size or in gaining access to major commercial markets but they often have opportunities to improve their lot through direct marketing or local markets.

PB81-107161 PC E02/MF E02
Fire Research Station, Borehamwood (England).
The Ventilation Required to Permit Growth of a Room Fire
Current papers
M. L. Bullen. c1978, 18p Rept no. CP-41/78

Keywords: Residential buildings, Fires, Heat loss, Ventilation, Heat transfer, Mass flow, *Fire safety, *Buildings, Foreign technology, Room fires, Fire spread.

In this report the heat release and heat loss rates for a fire in a domestic room are compared to establish a criterion for continuing fire growth in terms of the ventilation area. The equivalent ventilation areas for various combinations of leakage components are evaluated and thus the likelihood of fire growth assessed. The limitations of the model are considered and influence of the nature of the fuel briefly discussed.

PB81-107583 PC A04/MF A01
Applied Technology Council, Palo Alto, CA.
Home Builder's Guide for Earthquake Design. Guideline 6
Jun 80, 65p HUD/PDR-585
Prepared by Shapiro, Okino, Hom and Associates, San Francisco, CA.

Keywords: Residential buildings, Earthquakes, Structural design, Design criteria, *Buildings, *Houses, Seismic design, Seismic risk, *Earthquake engineering.

This HUD publication, a methodology for seismic design and construction of single - family dwellings, is condensed from a longer publication. The publication was issued following HUD's analysis of damage caused by a moderate earthquake which struck San Fernando, Calif., in 1971 and caused over $60 million of damage to single - family dwellings. It provides details to ensure that family swelling units contain structural features which are positioned, dimensioned, constructed, and interconnected properly to resist earthquake forces. It also includes a brief discussion of how earthquake forces affect buildings and presents some cautionary constraints regarding site selection and architectural designs. Discussions of the basic earthquake - resistive structural components, such as diaphragms, hear walls, and connections, are presented. The guide also gives design requirements for general features of dwelling construction, such as foundations, roofs, floors, and walls, and special features. Seismic Zones to which the guide refers are shown on Seismic Risk Maps of the United States. Finally, 46 construction details are recommended for use as supplements to existing buildings regulations to achieve the goal of improved design and construction of dwelling units in resisting eqrthquake forces. (Author abstract modified).

PB81-107955 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Pavement Engineering in Developing Countries
C. I. Ellis. c1979, 34p Rept no. TRRL-SUPPLEMENTARY-537
Also pub. as ISSN-0305-1315.

Keywords: Highways, Developing countries, Design, Cost analysis, *Roads, Flexible pavements, Concrete pavements, *Pavements, Foreign technology.

This report discusses the reasons for the differences between pavement engineering in temperate climates and in developing countries with tropical or sub-tropical climates. The importance of earth and gravel roads in developing countries is emphasized, and commonly used methods of pavement design for bitumen surfaced roads are described and compared. Recent developments in techniques and equipment for improving construction standards and for assessing road performance are described. The use of appropriate forms of contracts is briefly discussed and the need to improve knowledge of the factors which would enable total transport costs to be minimized is emphasized. (Copyright (c) Crown Copyright 1979.)

PB81-108052 PC A11/MF A01
New England River Basins Commission, Boston, MA.
Before the Well Runs Dry. Volume I. Literature Survey and Analysis of Water Conservation
Final rept.
Jul 80, 240p Rept no. WC-60-1

Sponsored in part by Geological Survey, Reston, VA. Resource and Land Investigations Program.

Keywords: *Water supply, Water conservation, Urban areas, Constraints, Prices, Demand(Economics), Project planning, Regulations, Water meters, Waste water reuse, Maintenance, Plumbing, Bibliographies, Cost effectiveness, Education, *Water management, New England, Water saving devices.

This volume summarizes the research that was done to develop a methodology for designing a local water conservation plan. The characteristics and problems of New England water suppliers servicing 10,000 or more persons were identified from a questionnaire. Similar information on suppliers in the rest of the United States was obtained from literature sources. This volume also examines economic concepts which a utility can use to assess and design alternative water conservation programs. The effects of conservation programs on water utility revenues and costs are described. Information on costs, percent of water reduction expected, money saved and other relevant facts are presented in tabular form on the following conservation measures: price structures; regulations; education campaigns and materials; metering; leak detection and repair; pressure reduction; water saving fixtures; and reuse/recycle systems.

PB81-108060 PC A09/MF A01
New England River Basins Commission, Boston, MA.
Before the Well Runs Dry. Volume II. A Seven Step Procedure for Designing a Local Water Conservation Plan
Final rept.
Jul 80, 185p Rept no. WC-80-2
Sponsored in part by Geological Survey, Reston, VA. Resource and Land Investigations Program.

Keywords: *Water supply, Water conservation, Urban areas, Management, Project planning, Objectives, Constraints, Cost effectiveness, Demand(Economics), Evaluation, Sales, Environmental impacts, Regulations, Design, Prices, Water meters, Education, Flow charting, *Water management, New England.

This volume presents a 7-step procedure for designing a water conservation plan for a supply system. The procedure is flexible, can be used by local water supply planners, and can meet multiple goals including reduced energy use and maintenance of water resources. The procedure is designed to respond to a problem within a supply system that can be solved by water conservation, solely or in conjunction with other water supply management methods. This volume describes how to perform each step in the procedure; lists what information is required to do each step; and provides guidance on which conservation programs are most effective for various goals.

PB81-109332 PC A12/MF A01
Soil Conservation Service, Washington, DC.
Soil Climate
I. A. Gol'tsberg, and F. F. Davitaya. c1980, 268p
Rept no. TT-74-52029

Keywords: Agronomy, Soil science, Climate, Books, Soil water, Heat transfer, *Soils, Temperature gradients, *Meteorology, Mapping, Physical properties, Permafrost, Moisture, Soil classification, Mathematical models, Atmospheric temperature, Statistical analysis, *USSR, Translations, Foreign technology.

This book contains papers presented at the conference on the study of soil climate sponsored by the agroclimatological section of the interdepartmental scientific council for the study of climatic and agroclimatic resources of the USSR. These papers present the results of research on hydrometeorological conditions of the soil, the mapping of individual elements of soil climate, methods of research, the effect of the heat regime and of soil moisture on the yield of agricultural crops and the agroclimatic zoning of the territory on the basis of special features of soil climate.

PB81-110231 PC A13/MF A01
National Environmental Engineering Research Inst., Nagpur (India).
Air Quality Monitoring. A Course Manual
Jul 78, 298p

Keywords: *Air pollution, Handbooks, Manuals, Sampling, Monitoring, Particles, Concentration(Composition), Sulfur dioxide, Nitrogen oxides, Industrial wastes, Combustion products, Exhaust emissions, Air quality.

The Refresher Course on Air Quality Monitoring is being organized for the benefit of engineers and scientists involved in control programmes. Various aspects such as meteorology, sampling and analytical techniques for particulate and gaseous pollutants, stack sampling, automobile emissions are covered in this Course. A comprehensive coverage of these subjects should prove to be of immense use to participants as well as to others involved in such programmes.

PB81-110405 PC A10/MF A01
California Arboretum Foundation, Arcadia.
Breeding Improvement of Rubber Yield in Guayule
Progress rept. no. 6
George P. Hanson. Jun 80, 211p NSF/RA-800118
Grant NSF-AER76-24472
Papers presented at the International Guayule Conference (3rd), Pasadena, California, April 29-May 1, 1980.

Keywords: Natural rubber, Hybridization, Plant genetics, Yield, Improvement, Acclimatization, Plant growth, *Rubber, Distribution(Property), Plant ecology, Plant diseases, Tolerances(Physiology), Greenhouses, Seeds, Texas, Mexico, *Guayule.

Summarized are recent studies in the breeding improvements of rubber yield in guayule. Breeders working for the Emergency Rubber Project developed a number of cultivars from which seed was preserved and stored by USDA. These activars, augmented by new collections from Texas and Mexico, serve as the germ plasm base for recent breeding programs. Topics covered in this report include: Breeding for high rubber yield and improved adaptation in guayule; observation on the distribution and ecology of native guayule populations in Mexico; harvesting and cleaning of bulk guayule seed; guayule propagation and growth under greenhouse conditions; interspecific hybridization; evaluating resistance in verticillium wilt disease in species of Parthenium; Phytophthora root rot disease and other pests of guayule culture; distribution of rubber and comparative stem anatomy of high and low rubber guayule from Mexico; and growth studies of cultivated guayule.

PB81-110512 PC A06/MF A01
Dynecology, Inc., Harrison, NY.
Energy from Biomass: The Simplex Process for the Gasification of Coal and Forest Pulp
Final rept. Jan 79-Mar 80
J. C. Arbo, and D. P. Glaser. Apr 80, 103p
NYSERDA-80-2

Keywords: Coal, *Wood wastes, Biomass, *Gasification, Briquetting, Briquets, Solid waste disposal, Simplex process.

Simplex is a process which simultaneously turns coal and cellulosic materials such as municipal solid wastes, forest pulp and sewage sludge solids into gas. This report summarizes a series of tests performed to investigate the adaptation of the Simplex process to the gasification of forest pulp or wood wastes. A coal and forest pulp briquette formulation, needed for the gasification process, was developed as part of the project. The sample briquettes were successfully turned into gas.

PB81-110785 PC A05/MF A01
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume I
Final rept. 1 Nov 76-1 Nov 79
C. R. Guerra, B. L. Godfriaux, A. F. Eble, A. Farmanfarmaian, and R. Pitman. Mar 80, 100p NSF/RA-800187
Grant NSF-ENV76-19854
Also available in set of 3 reports PC E17, PB81-110777.

Keywords: *Aquaculture, Cooling water, Fresh water fishes, Thermal pollution, Electric power, Recovery, Trout, Shrimps, Catfishes, Eels, Prototypes, Larvae, Reproduction(Biology), Feeding stuffs, *Waste heat utilization.

A three-year research study on the constructive use of electric generating station waste heat in cooling water effluents for fish production is summarized. Results of the project indicate not only that it is biologically feasible to rear fresh water shrimp and rainbow trout alternately during warmer and cooler months directly in these effluents, but that it appears to be economically and technically feasible. A prototype commercial waste heat aquaculture facility for the high density culture of both finfish and shellfish is described in a subsequent proof-of-concept study. This volume presents the research objectives, approach, and product use and a technical section outlining the engineering, biological, and economic feasibility as well as product quality.

PB81-110793 PC A14/MF A01
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume II
Final rept. 1 Nov 76-1 Nov 79
A. F. Eble. Mar 80, 314p NSF/RA-800188
Grant NSF-ENV76-19854
Also available in set of 3 reports PC E17, PB81-110777.

Keywords: *Aquaculture, Cooling water, Fresh water fishes, Chlorination, Electric power, Seafood, Trout, Shrimps, Catfishes, Eels, Pumps, Circulation, Oxygen, *Waste heat utilization.

A three-year research study on the constructive use of electric generating station waste heat in cooling effluents for fish production is presented. This volume specifically describes that part of the research conducted by Trenton State College. Water temperatures from the discharge canal of the Mercer Generating Station in New Jersey were blended with those from the Delaware River by pumps installed in strategic locations to achieve desired temperatures. The report further describes how recirculation is controlled during chlorination periods by activating and de-activating certain pumps. As a result of this procedure, plus an oxygen injection system, trout density was greatly increased. Techniques for growing and maintaining shrimp larvae and early juveniles in nursery systems are described. Harvest densities of the shellfish did not compare with those obtained for finfish.

PB81-110801 PC A07/MF A01
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume III
Final rept. 1 Nov 76-1 Nov 79
A. Farmanfarmaian. Mar 80, 133p NSF/RA-800189
Grant NSF-ENV76-19854
Also available in set of 3 reports PC E17, PB81-110777.

Keywords: Cooling water, *Aquaculture, Thermal pollution, Electric power, Fresh water fishes, Shrimps, Trout, Survival, Growth, Metabolism, Coal, Animal behavior, Histology, Mercury(Metal), Temperature, Dissolved gases, Oxygen, Calcium, *Waste heat utilization, Water pollution effects(Animals).

This report is part of a three year research study on the constructive use of electric generating station waste heat in cooling water effluents for fish production. It describes procedures and methods for the commercial culture of the giant fresh water shrimp, Macrobrachium rosenbergii, and the rainbow trout, Salmo gairdneri, in the thermal discharge water of the Mercer Power Plant in Trenton, New Jersey. Discharge water from this plant was used in a preliminary assessment of the survival, growth, and food conversion ratio of these species. It was shown that acute or chronic exposure to power plant intake and discharge water; discharge with or without coal particles; and discharge with or without slurry overflow mix does not significantly affect metabolism, short-term survival, growth, or conversion efficiency of shrimp or trout.

PB81-111064 PC A08/MF A01
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Planning Wastewater Management Facilities for Small Communities
Final rept. Sep 77-Jun 79
Patricia L. Deese, and James F. Hudson. Aug 80, 160p* EPA-600/8-80-030
Contract EPA-68-03-2614

Keywords: *Sewage treatment, Urban areas, Manuals, Sewage disposal, Septic tanks, Sewers, Gravity, Cost analysis, Grants, Allocations, Regulations, Evaluation, Design, Maintenance, Environmental impacts, Population growth, *Community development, Small communities, Alternative planning, Trade offs.

This manual presents a set of procedures for planning wastewater management facilities for small communities and is directed at areas with populations of under 10,000. It is designed to aid engineers and the communities they serve in evaluating various options for treatment and disposal of wastewater, which range from septic tanks and on-site disposal fields to conventional gravity sewers and centralized treatment plants. Information and techniques are presented for recognizing and evaluating wastewater management problems frequently faced by small communities and for planning the range of facilities which will solve those problems, giving due consideration to costs, community characteristics, and growth management.

PB81-113177 PC A05/MF A01
General Electric Co., Philadelphia, PA.
Land Biomass Program
Annual rept. 1 Apr-31 Dec 79
K. Jain. Sep 80, 88p GRI-79/0055
Contract GRI-5011-323-0159

Keywords: Biomass, *Wood, *Plants(Botany), *Methane, *Grass, Sampling, Anaerobic processes, Gasification, Chemical analysis, Farm crops, Residues, Concentration(Composition), *Fuels, Land biomass.

This report describes the results of the 1979 efforts on the Land Biomass program. The program is a long range research and development effort and the results described are preliminary. The overall objective of the program is to develop integrated processes including production, harvesting, and conversion, to produce methane from land-based crops that are cost-competitive on a commercial basis with alternative sources of energy. A program plan based largely on short rotation farming of herbaceous and woody biomass is described. Significant land related issues such as suitability and availability of land, and system parameters such as biomass productivity, methane yield, feedstock cost, unit product cost, and overall system efficiency are reviewed. Sixteen candidate species of woody and herbaceous biomass were selected based on certain selection criteria discussed in the report. Samples of these species were collected for composition analysis and to obtain experimental data on methane yields. Both the anaerobic digestion and thermal gasification techniques are being evaluated for the production of methane from biomass samples.

PB81-113482 PC A09/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Fire Investigation Handbook
Final rept.
Francis L. Brannigan, Richard G. Bright, and Nora H. Jason. Aug 80, 200p* Rept no. NBS-HB-134
Sponsored in part by Fire Administration, Washington, DC. Prepared in cooperation with Maryland Univ., College Park. Fire and Rescue Inst. Library of Congress catalog card no. 80-600095.

Keywords: Fires, Investigations, Handbooks, Ignition, Combustion, Law(Jurisprudence), *Fire safety, Fire investigation, Arson.

The handbook is a reference tool designed to be used by the beginning or by the experienced fire investigator. How each person uses this book will depend upon a particular need and level of experience. The broad areas covered are: Fire Ground Procedures; Post-fire Interviews; The Building and its Makeup; Ignition Sources; the Chemistry and Physics of Fire and Sources of Information. The appendices have sections on how to organize an arson task force; the expert witness; independent testing laboratories; and selective bibliography.

PB81-113540 PC A05/MF A01
California Univ., Davis. Dept. of Vegetable Crops.
Air Pollution and Agriculture Seminar
Final rept.
J. Hodge Black. Oct 79, 77p ARB-R-79/127
Contract ARB-A7-189-30
Proceedings of a conference held at Davis, California on October 10, 1979.

Keywords: *Air pollution, Meetings, Sulfur, Nitrogen oxides, Ozone, Farm crops, Humidity, *Agriculture, *Vegetables, Vegetable crops, Cotton plants, Trees(Plants), Potatoes, Defects, Plant tissues, Smog, Exhaust gases, Chemical reactions, Hydrocarbons, California, Precipitation washout, Air pollution effects(Plants), Alfalfa.

On October 16, 1978, an all day conference entitled 'Air Pollution Effects on Vegetation in Northern California', was held on the Davis campus of the University of California. A second conference was held in Bakersfield on October 10, 1979, entitled 'Air Pollution and Agriculture'. These conferences were intended to disseminate information gained from several years of research on air pollution effects. Topics covered included sulfur pollutants, problems of nitrogen oxides and ozone, the interaction of pollutants with humidity and crop growth, and the problem of acid rain. Increased discussion of siting coal fired power plants and oil development in some of the State's richest agricultural land made the research and conference timely.

PB81-114472 PC A05/MF A01
Swedish Council for Building Research, Stockholm.
United Nations Seminar of Experts on Building Codes and Regulations in Developing Countries, Held at Taelberg and Stockholm (Sweden) on March 17-24, 1980
Mar 80, 89p ISBN-91-540-3251-2, D18:1980, CHS/R-80-1

Keywords: Building codes, Developing countries, Meetings, Regulations, Quality of life, *Housing, *Houses, *Buildings, Housing studies, Housing planning, Foreign technology.

The Seminar sought to explore ways in which governments and the international community, especially UNCHS, might build upon the recommendations adopted by HABITAT: the United Nations Conference on Human Settlements. Thus, effort concentrated on examining how building codes and regulations can be adapted to meet the basic needs of the poor. As noted in the Preamble, the Seminar recommends: what Governments institute programs for a graduated or a step-by-step improvement in the quality of life of the least advantaged on a continuous basis, thus ensuring that the total population can achieve an acceptable standard of living within a reasonable period of time. Within this framework, ten detailed recommendations were approved and are presented in this report. Each recommendation addresses specific actions that should be taken in respect of building codes and regulations.

PB81-114654 PC A03/MF A01
North Carolina Water Resources Research Inst., Raleigh.
Characterization and Land Application of Seafood Industry Wastewaters
Michael R. Overcash, and Dhiraj Pal. Aug 80, 49p UNC-WRRI-80-142, ORWT-B-100-NC(10)
Contract DI-14-34-0001-7173

Keywords: *Irrigation, Seafood, *Food processing, Industrial waste treatment, Soil properties, *Waste water, *Industrial wastes, Clay soils, Soil texture, Loams, Sands, Nitrogen, Phosphorus, Calcium, Decomposition, Shrimps, Oysters, Crabs, Aerobic processes, Biochemical oxygen demand, North Carolina, Land application.

Soil-plant systems are capable of utilizing seafood industry waste water with little or no pretreatment requirements. Raw waste from seafood processing plants contain substantial plant nutrients including nitrogen, phosphorus and calcium. In calculating a capacity for soil-plant assimilation of waste effluents, land areas necessary for the environment compatible operation of a treatment site were estimated. Four segments of the seafood processing industry; (shrimp, crab, tuna, and oyster) were selected for land treatment evaluation. Bulk volume and composition of waste were characterized for average size plants. One objective was to further demonstrate the utility of a recently developed complete design procedure for land treatment of the entire waste stream from any given industry. Two common soil characteristics were focused on as representing significantly different soil textures: a sandy loam, and a clay loam soil.

PB81-115917 PC A02
Louisiana State Univ., Baton Rouge. School of Forestry and Wildlife Management.
Production of Crayfish in Rice Fields
Reprint
Yew-Hu Chien, and James W. Avault, Jr. Apr 80, 7p LSU-R-80-005, NOAA-80091510

Keywords: *Rice, Crayfishes, *Aquaculture, Ponds, Growth, Volume, Calcium, Soils, Production, Yield, Mathematical models, Field tests, Tables(Data), Louisiana, Reprints.

A study was conducted to determine how rice (Oryza sativa) and crayfish (Procambarus clarkii) affect each other in the field and to determine optimal stocking rates of crayfish. High rice production correlated with large numbers of adult crayfish present during the rice-growing season. Average crayfish production was significantly higher in rice pond than in control ponds. Von Bertalanffy's growth model revealed that the average maximum length attained by crayfish in rice ponds was greater than in control ponds.

PB81-116683 PC A02/MF A01
Health Effects Research Lab., Cincinnati, OH.
Disease Outbreaks Caused by Drinking Water
Journal article
Gunther F. Craun. 1980. 7p Rept no. EPA-600/J-80-160

Keywords: Potable water, *Diseases, Public health, *Water quality, *Water pollution, Reviews, Reprints, Drinking water.

A review of the medical, scientific, and engineering literature for 1979 was conducted for disease outbreaks caused by drinking water.

PB81-119141 MF A01
National Research Council, Washington, DC. Committee on Scholarly Communication with the People's Republic of China.
Wheat in the People's Republic of China
Virgil A. Johnson, and Halsey L. Beemer, Jr. Nov 77, 200p Rept nos. CSCPRC-6, ISBN-0-309-02637-7
Library of Congress catalog card no. 77-90510.
Paper copy available from: Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, DC. 20418.

Keywords: *Wheat, Agronomy, *China, Soil classification, Mulches, Agricultural machinery, Plant diseases, Production, Education, Standards.

Based on the observations of a team of agricultural scientists who visited China to study the Chinese wheat production system from breeding to milling, this report also offers an informative glimpse at the social, political, and educational framework of agriculture in China.

PB81-119349 PC A10/MF A01
National Research Council, Washington, DC. Committee on Scholarly Communication with the People's Republic of China.
Plant Studies in the People's Republic of China: A Trip Report of the American Plant Studies Delegation
1975. 219p Rept no. ISBN-0-309-02348-3
Sponsored in part by Rockefeller Foundation, New York. Library of Congress catalog card no. 75-13564.

Keywords: Plants(Botany), *Vegetables, *China, Surveys, *Agriculture, Organizations, River plants, Wheat plants, Fruit crops, Grain crops, Forage grasses, Ornamental plants, *Cotton plants, Plant genetics, *Grains(Food), Horticulture, Agronomy, Plant diseases, Education, *Crops.

Partial contents:
- Organization of science and agriculture in China;
- The status of agriculture;
- Reports on specific crops;
- The biological sciences in China;
- Potential for germ plasm exchange.

PB81-120263 PC A03/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Battery
Rept. no. 10.

Nov 80, 29p

Keywords: Electric batteries, *Lead(Metal), Research, *Batteries, *India, *Zinc, Foreign technology.

Contents:
- Outlook for lead, zinc and cadmium in India;
- Future for lead production and recycling--a British view;
- AKERLOW lead recovery plant;
- Expanded lead battery grids;
- Resume of first solder seminar in India;
- Automatic paste soldering adds sparks to zinc-carbon batteries;
- 122-ton lead battery used for testing BEST facility;
- Press release on Pb 80;
- Research and development;
- Second international symposium on industrial and oriented basic electrochemistry;
- Felicitations;
- Industry news;
- Book review and new publications;
- Battery abstracts.

PB81-120289 PC A11/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Seminar on Zinc Wastes and Their Utilization Technical Papers Held at New Delhi, India on October 15 and 16, 1980
Nov 80, 227p

Keywords: Wastes, *Zinc, Zinc sulfates, Materials recovery, Meetings, Byproducts, Technical reports, Utilization, *Waste recycling, *India, Foreign technology, Metal recyling.

Topics covered are zinc sulfate and zinc recovery.

PB81-120297 PC A10/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Proceedings of Solder Seminar Held at West End Hotel, Bangalore on November 5 and 6, 1979
Nov 80, 214p

Keywords: *Soldering, Meetings, Soldering fluxes, Quality control, Tests, Standardization, Safety, Foreign technology.

Contents:
- Solder systems;
- Soldering fluxes and techniques;
- Quality and testing;
- Standardization and safety;
- Soldering in electronics industry;
- Soldering in other industries.

PB81-122491 PC A05/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Lead and Zinc in Developing Countries: Problems and Prospects. A Report on the Mini Seminar Held at New Delhi, India on October 3, 1978
1978, 91p

Keywords: Developing countries, India, *Lead(Metal), *Zinc, Meetings, Production, Mineral deposits, Zinc ore deposits, Zinc coatings, Consumption, Agriculture, Prices, Zinc industry, Industrial development.

The seminar held in New Delhi during October 1978 has been the first ever programmed, exclusively devoted to lead and zinc in developing countries. The presentations were replete with authoritative statistics and bold and realistic predictions for the next decade. The sectoral presentations applicable to India would serve a very useful purpose at the planning and entrepreneurial levels. The report contains the edited version of the deliberations of the seminar and will be a very useful reference volume for the lead and zinc consumer interests.

PB81-122640 PC A19/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Cropping Systems Research and Development for the Asian Rice Farmer, Proceedings of the Symposium Held at Los Banos, Philippines on September 21-24, 1978
1977, 437p AID-PN-AAG-866
Grant AID/ta-G-1074

Keywords: *Rice, Agronomy, *Agricultural economics, Meetings, *Asia, Research projects, Production, Plant growth, Management, Yield, Fertilizing, *Weed control, Design, *Pest control, Acclimatization, Developing country application, Cropping systems.

This book contains 25 papers and additional discussions from a symposium on cropping systems and development for the Asian rice farmer. The papers present strategies for planning and implementing cropping systems research programs to increase farm income and improve the quality of farm life. Cropping systems research focuses on efforts to increase crop yields, but also concerns itself with the number of crops grown each year.

PB81-122756 PC A04/MF A01
International Council of Scientific Unions, Kuala Lumpur (Malaysia). Committee on Science and Technology in Developing Countries.
Proceedings of the Symposium on Science, Technology and Development: Views from the Developing World Held at Kuala Lumpur, Malaysia on April 27-30, 1979
Apr 79, 52p AID-PN-AAG-948

Keywords: Research management, Developing countries, Meetings, *Agriculture, *Technology transfer, *Education, *Information services, *Natural resources, Public health, Developing country application.

The report summarizes the proceedings of the symposium. Draft documents, prepared earlier by groups of scientists, were discussed in group meetings and in plenary sessions at Kuala Lumpur. Each section of this report represents a summary of those draft documents. The proceedings are envisaged as an input from the LDC scientific community into the UN Conference on Science and Technology for Development. The summaries cover eight topics: the concept of development, science education, scientific research, scientific information services, agricultural development programs, health services and medical education, technology transfer, and natural resources. The summaries include the following recommendations: (1) formulation of development programs to meet human needs; (2) integrated exploration, conservation, utilization, and management of natural resources; (3) support for locally relevant science education, teaching aids, and technician training; (4) promotion of development-oriented scientific research through a suitable reward system; (5) provision of primary health care for all people; (6) popularization of diversified food sources; (7) support for scientific and technical information dissemination; (8) provision of an integrated plan of technology transfer covering all aspects of development, production, and marketing.

PB81-122830 PC A10/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Proceedings of the International Workshop on Energy Survey Methodologies for Developing Countries Held at Jekyll Island, Georgia on January 21-25, 1980
Final rept.
Sep 80, 225p Rept no. CIR/BOSTID-80/ESM
Contract AID/DSAN-G-0190

Keywords: Developing countries, Meetings, Rural areas, Urban areas, Foreign countries, Surveys, *Energy source development, Energy supplies, Energy consumption, Industrial sector, Transportation sector.

Proceedings of international workshop convened to examine past efforts in energy surveying, and determine how better energy-related information may be obtained in developing countries. Reports from rural, urban, industry and transportation working groups, excerpts from 12 background papers, and a directory of energy surveys for developing countries are included. This directory presents the current state of the art in the energy survey field, listing all identified energy surveys, indicating which countries and which donor organizations have carried out surveys, and describes the goals and designs of those surveys.

PB81-123689 PC A05/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Proceedings of the Symposium on Battery Systems in the 80s Held in New Delhi, India on February 28, 1979
Nov 80, 85p

Keywords: Electric batteries, Meetings, Technology, Trends, Lead acid batteries, Industrial plants, Electric vehicles, Solar cells, *Batteries, *India, Foreign technology.

A symposium on 'Battery Systems in the 80s' was held in New Delhi on 26th February 1979, with the objective of systematically presenting not only the status of the battery industry in the country but also to make a realistic assessment of the emerging trends in battery technology. While acknowledged experts in the fields of lead and lead acid batteries from India and abroad presented papers covering comprehensively the different aspects of battery systems, the participants were senior executives, technologists and government officials from user and producer interests. Representing the producer interests were the producers of lead and zinc and battery manufacturers. The symposium afforded an opportunity for not only exchange of information but also for cross-fertilization of ideas.

PB81-124745 PC A05/MF A01
Agency for International Development, Washington, DC.
New Directions Rural Roads
A.I.D. program evaluation discussion paper no. 2
Judith Tendler. Mar 79, 82p Rept no. AID-PN-AAG-670

Keywords: Rural areas, *Roads, Construction, Developing countries, Manpower, *Employment.

The paper examines rural road projects in the light of the Agency's 'New Directions' mandate to improve the lot of the rural poor. Attention is foscussed in particular on the relative merits of labor-based vs. equipment based construction techniques. Although equipment-based techniques are traditional in donor-recipient projects and often prove administratively or financially more attractive to both, labor-based techniques more greatly benefit the poor by generating employment and by reducing costs.

PB81-125742 PC A04/MF A01
Agency for International Development, Washington, DC.
Policy Directions for Rural Water Supply in Developing Countries
A.I.D. program evaluation discussion paper no. 4
Ian Burton. Apr 79, 55p Rept no. AID-PN-AAG-691

Keywords: *Water supply, Rural areas, Policies, Design, Education, Equipment, Maintenance, Questionnaires, Trends, Evaluation, Developing country application.

This report presents ideas and current state of knowledge on the design, installation and maintenance of rural water supply systems throughout the developing world. Evaluation techniques have included questionnaires and protocal methods, quick on-the-spot field investigations, and a few in-depth studies. Greater emphasis is being placed on education, manpower training, institution building, and relations with local communities. Continued operation and maintenance of water supply systems following the departure of foreign personnel is a significant problem. The author recommends that in the future greater priority be given to rehabilitation of existing systems and to consumer satisfaction.

PB81-125775 PC A03/MF A01
Rhode Island Univ., Kingston. Dept. of Sociology and Anthropology.
Investment Orientations Among Small-Scale Fishermen in the Gulf of Nicoya, Costa Rica
Richard B. Pollnac. Aug 77, 33p ANTHROPOLOGY/WP-19, AID-PN-AAG-605
Contract AID/csd-2455

Keywords: Fishing, Economic development, Social anthropology, *Costa Rica, *Socioeconomic status, Sociology, Income, Mass media, Investments, *Fisheries, Gulf of Nicoya(Costa Rica), Developing country application.

The paper reports study of 125 small-scale fishermen's investment orientations and their sociocultural correlates in the Gulf of Nicoya, Costa Rica. The interview schedule contained items on investment orientation using a hypothetical situation; self evaluation of socioeconomic position, perceived socioeconomic

progress, optimism and efficacy; material culture such as household amenities and fishing technology; mass media exposure; and income, age and education. Data tables and diagrams are provided.

PB81-126054 PC A10/MF A01
Academy for Educational Development, Inc., Washington, DC.
Non Formal Education in El Salvador: Rural Living Skills Project
William Field, and Rodrigo Cabrera. Jul 79, 224p
AID-PN-AAG-706
Contract AID-519-193

Keywords: Specialized training, *El Salvador, Project planning, Cost analysis, Requirements, Schools, Employment, Rural areas, *Training, *Education, Developing country application, Curricula.

The document provides the final report on a series of studies conducted by the Academy for Educational Development, under contract with AID, to assist the Ministry of Education of El Salvador and USAID develop a Rural Living Skills Project. The report consists of documents in six specified areas and is prefaced by an introduction which presents an overview of the authors' findings and recommendation. The first document presents a brief history of non-formal education in El Salvador. The second document outlines the structure and function of the Ministry of Education's present training system. The third presents a time-phased training plan for both in-service and participant training for the Rural Living Skills Project. The fourth document outlines the basic theories for a model system of investigation-evaluation of the project. A large part of this latter document is written in Spanish. The two final documents outline the technical assistance and facilities demanded by the project, including budgetary considerations and recommendations on the use of mobile training units.

PB81-126062 PC A03/MF A01
Nairobi Univ. (Kenya). Population Studies and Research Inst.
Recent Demographic Trends in Kenya and Their Implication for Economic and Social Development
R. A. Henin. Jul 79, 44p AID-PN-AAG-871

Keywords: Demographic surveys, *Kenya, Economic development, Populations, Planning, Development, Fertility, *Population control, Mortality, Sociology, Africa.

The paper contains discussion, tables, and diagrams regarding demographic data for Kenya. Outlines the relationship between population and development planning. Discusses fertility/mortality levels and trends for Africa and Kenya. Details fertility and mortality trends in Kenya 1962-1972 including variations in marriage patterns and summarizes 1977 findings with regard to fertility/mortality levels and trends (rate of natural increase). Population projections to 1989 and implications of these for some aspects of the country's economic and social development program are included. Appendix contains notes on analytic methodology of the 1977 national demographic survey and projections methodology.

PB81-126427 PC A99/MF A01
West Virginia Univ., Morgantown.
Hill Lands. Proceedings of the International Symposium Held at West Virginia University, Morgantown on October 3-9, 1979
J. Luchok, J. D. Cawthon, and M. J. Breslin. 1976, 785p AID-PN-AAG-910
Grant AID/ta-G-1309

Keywords: Hills, Farm crops, Livestock, Meetings, Production, *Land use, Mountains, *Grass, *Leguminous plants, Erosion control, Forage grasses, Beef cattle, Fertilizers, Sheep, Land reclamation, Pasture, Soil conservation, Plant genetics, Tropical regions, *Animal husbandry, *Soil erosion, *Crops, Developing country application, Ecosystems.

The report includes a compilation of 137 papers presented at the International Symposium originally convened to consider means of increasing the agricultural use and productivity of hill land areas in the United States. The scope of the conference was expanded to include the use of hill land for both crop and animal production in tropical and temperate regions of the world. Land rehabilitation, erosion, cropping patterns, fertilizer usage, livestock production, hill ecosystems and socio-cultural factors are among the topics presented.

PB81-127979 PC A02/MF A01
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
How to Build a Crab Pot
Kathy Hart, and Jim Bahen. 1980, 17p UNC-SG-80-03, NOAA-80102006

Keywords: Fishing, Crabs, Manuals, Construction, Construction materials, *Aquaculture, Regulations, North Carolina, Sea Grant program, Crab pots.

This manual provides detailed instructions on the materials needed and the methods used to construct crab pots. North Carolina regulations on crab pots are also given.

PB81-128167 PC A06/MF A01
Science Research Systems, Inc., Ruston, LA.
Drinking Water and Cancer: Review of Recent Findings and Assessment of Risks
Final rept.
Kenny S. Crump, and Harry A. Guess. Dec 80, 106p*
Contract EQ10AC018

Keywords: Potable water, Malignant neoplasms, Epidemiology, Contaminants, Assessments, *Diseases, Risk, Hazards, *Water pollution, Ground water, Carcinogens, Organic compounds, Chlorine, Concentration(Composition), *Water quality, Cancer, Drinking water, Health risks, Carcinogenesis.

An assessment of evidence of cancer risks to humans from organic contaminants in drinking water: (1) review of epidemiological literature with emphasis upon case control studies, (2) use of animal data to estimate the carcinogenic potencies of synthetic organic chemicals found recently as contaminants of drinking water from some ground water sources, and (3) discussion of needed research.

PB81-128803 PC A07/MF A01
Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.
Design for Manual Handling and Assembly - A Selection of Papers (Design for Manufacturability)
Report no. 4
G. Boothroyd. Sep 79, 143p NSF/RA-790281
Grant NSF-APR77-10197

Keywords: Design, Manufacturing, *Materials handling, Optimization, Production engineering, Assembling, *Product development, Computer aided manufacturing, Computer aided design.

Research papers are presented in the field of design for manual handling. Topics covered include: information on the design of parts and products for economic manufacture; a study of the effect of part symmetry on the time taken to handle the parts during manual assembly; a study of the effect of part size and thickness on the time required to handle the parts during manual assembly; a study of the effects of shape, size, and the relative orientation of two mating parts on the time for intraposition or circumposition during manual assembly; a design to avoid jamming during assembly; a design of a chamfer to reduce the contact stresses, jamming and wedging between mating parts during assembly processes; and a conical chamfer to minimize assembly times. Comparisons of new methodologies applied to manufacturing design and a computer study of the classification of eight assembly systems are also provided.

PB81-129975 PC A04/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Postharvest Food Losses in Sri Lanka; Report of a Workshop, 11-16 February 1980
Final rept.
Dec 80, 70p Rept no. CIR/BOSTID-80/SRI
Contract AID/ta-C-1433
Sponsored in part by National Science Council of Sri Lanka, Colombo, and Sri Lanka Foundation Inst., Colombo.

Keywords: Food, *Food processing, *Sri Lanka, Meetings, Losses, *Fruits, *Vegetables, *Grains(Food), Leguminous plants, Oilseed crops, *Fishes, Food storage, Recommendations.

The report describes a joint workshop organized by the National Science Council of Sri Lanka and the U.S. National Academy of Sciences. The workshop objective was to make recommendations for reducing postharvest food losses in three general categories--food grains, perishables, and fish.

PB81-132763 PC A04/MF A01
Maine Univ. at Orono. Dept. of Animal and Veterinary Sciences.
Lobster Nutrition Workshop Proceedings, 1980 Held at the University of Maine at Orono, January 15 and 16, 1980
Robert C. Bayer, and Anthony D'Agostino. 1980, 64p MSG-TR-58, NOAA-80100801
Grant NA-79AA-D-00057
Prepared in cooperation with New York Ocean Science Lab., Montauk, NY.

Keywords: Lobsters, Animal nutrition, Meetings, *Aquaculture, Diets, Feeding stuffs, Growth, Proteins, Vitamins, Sea Grant program, Homarus americanus.

Partial contents: Operation of a lobster pound in Maine; A commercial view of lobster nutrition; Vitamin leaching in lobster rations; The effect of low-protein feeds on bioenergetics of juvenile lobsters; Considerations of the lecithin and protein requirements of juvenile lobsters; Recent progress in lobster nutrition at Bodega Marine Laboratory; A diet for feeding adult American lobsters in lobster pounds; Growth and color of juvenile lobsters (Homarus americanus) kept on diets of natural and artificial foodstuff; Comparison of non-destructive and destructive parameters for measurement of growth in adult american lobsters.

PB81-134132 PC A03/MF A01
Indian National Science Academy, New Delhi.
Science and Industry Workshop on Management and Role of R and D for Industry Held at New Delhi on April 2-3, 1960. Summary and Recommendations
c1980, 38p

Keywords: Meetings, *India, Industries, Research management, Technological intelligence, Consulting services, Financing, Environmental impacts, *Research and development, *Industrial development.

The Indian National Science Academy brought together leading scientists, industrialists, government representatives and community leaders with a view to promoting close and continuing interaction between them and to draw their attention on pressing problems regarding harnessing of Science and Technology for Industrial Development. The workshop discussed the topics like: Present Status of Industrial R & D in Government Laboratories and Universities; Consultancy Services in India; Role of R & D for Industry; Management and Funding of Industrial R & D; and Perspective Planning and Environment, in its various sessions.

PB81-134306 PC A05/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Hardwood Tree Grades for Factory Lumber
Forest Service research paper (Final)
Leland F. Hanks. 1976, 86p Rept nos. NEFES/81-150, FSRP-NE-333

Keywords: Lumber, Forest trees, Standards, Yield, Hardwood, Maple trees, Oak trees, *Wood, Diameter base height.

The Forest Service hardwood tree grades for factory lumber are described, and lumber grade yields for 11 species are presented in the report. The yields, expressed in board feet, are based on equations in which dbh sq and merchantable height were used as independent variables. Actual board-foot volumes by lumber grade served as dependent variables.

PB81-134702 PC A06/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.

Small Manufacturing and Repair Enterprises in Haiti: Survey Results
Steve Haggblade, Jacques Defay, and Bob Pitman. 1979, 123p MSU/RURAL DEVELOPMENT WP-4, AID-PN-AAG-937
Contract AID/ta-CA-2
Prepared in cooperation with Pragma Corp.

Keywords: *Haiti, Economic development, Repair shops, Manufacturing, Economic surveys, Maintenance, Demand(Economics), Capital, Fixed investment, Skilled workers, Management, Raw materials, Manpower, *Employment, Income, Businesses, *Small businesses, Industrial structure, Developing country application.

The paper is designed to enhance the ability of AID missions and host country institutions to identify and implement programs and policies that generate off-farm employment and income opportunities benefiting the rural poor. The paper itself presents the results of a survey of small manufacturing and repair businesses (less than 50 workers) in Haiti. After a brief outline of the overall industrial sector, the survey methodology, geographic coverage and data collection procedures are first sketched. A broad overview of the small enterprise sector follows, describing its extent, composition, and basic characteristics. Next, the potential constraints faced by Haitian small enterprises are examined in detail, with specific discussion of issues concerning the demand for small enterprise output, capital constraints, raw materials, and management and skilled labor problems. The report concludes with a summary of the main findings and recommendations.

PB81-134769 PC A11/MF A01
Office of Technology Assessment, Washington, DC.
Energy From Biological Processes. Volume II. Technical and Environmental Analyses
Sep 80, 228p* Rept no. OTA-E-128

Keywords: Biomass, *Fuels, Technology, *Ethanol, *Bioconversion, Anaerobic processes, Fermentation, *Alcohols, *Agricultural wastes, *Wood, Sources, Thermochemistry, Environmental impacts, Synthetic fuels, Biological processes, Alcohol fuels, Chemical feedstocks.

This volume presents the technical and environmental analyses on which the conclusions in volume I are based. 'Part I: Biomass Resource Base' includes forestry, agriculture, processing wastes, and various unconventional sources including oil-bearing and aquatic plants. 'Part II: Conversion Technologies and End Uses' considers thermochemical conversions, fermentation for ethanol production, anaerobic digestion, use of alcohol fuels, select energy balances, and a brief description of chemicals from biomass. In each case, appropriate technical, economic, and environmental details are presented and analyzed.

PB81-134777 PC A17/MF A01
Office of Technology Assessment, Washington, DC.
Energy from Biological Processes. Volume III. Appendixes. Part A: Energy from Wood
Sep 80, 387p*

Keywords: Biomass, *Wood, Fossil fuels, Substitutes, Residues, *Fuels, *Forestry, Economic analysis, Technology, Environmental impacts, Scenarios, Synthetic fuels, Biological processes, Chemical feedstocks.

This working paper was written for OTA to assist in preparation of the report, ENERGY FROM BIOLOGICAL PROCESSES. The purpose of the study is to inquire into the feasibility of fostering further substitution of wood for fossil fuels. It is the author's conclusion that there is a surplus of wood that could be used for fuel in substitution for fossil fuels, and, on a renewable basis, this supply could be very substantially increased if it were national policy to do so.

PB81-134785 PC A99/MF A01
Office of Technology Assessment, Washington, DC.
Energy from Biological Processes. Volume III. Appendixes. Part B: Agriculture, Unconventional Crops, and Select Biomass Wastes
Sep 80, 856p*

Keywords: Biomass, *Agricultural wastes, Farm crops, *Bioconversion, Aquaculture, *Fuels, Brackish, Cost analysis, Synthetic fuels, Biological processes, Solid wastes, Gasohol, Manure, Alcohol fuels.

This volume contains the following working papers written for OTA to assist in preparation of the report, ENERGY FROM BIOLOGICAL PROCESSES: The Potential of Producing Energy From Agriculture; Cropland Availability for Biomass Productin; Energy From Agriculture: Unconventional Crops; Energy From Aquaculture Biomass Systems: Fresh and Brackish Water Aquatic Plants; Energy From Agriculture: Animal Wastes; and Energy From Agriculture: Agricultural Processing Wastes.

PB81-134793 PC A99/MF A01
Office of Technology Assessment, Washington, DC.
Energy from Biological Processes. Volume III. Appendixes. Part C: Select Conversion Technologies and End Use
Sep 80, 719p*

Keywords: Biomass, Thermochemistry, Gasification, Methyl alcohol, Ethanal, *Bioconversion, *Alcohols, *Fuels, Anaerobic processes, Technology, Blends, Fuels, Synthetic fuels, Biological processes, Alcohol fuels, Gasohol.

This volume contains the following working papers written for OTA to assist in preparation of the report, ENERGY FROM BIOLOGICAL PROCESSES: End Use of Fluids from Biomass as Energy Resources in Both Transportation and Nontransportaton Sectors; Thermochemical Conversion of Biomass: the Scientific Aspects; Engineering Aspects of Thermochemical Conversion; and Biological Production of Gas.

PB81-134835 PC A05/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
A Bibliography on Rural Development in Tanzania
James E. Kocher, and Beverly Fleischer. 1979, 85p MSU/RURAL DEVELOPMENT PAPER-3, AID-PN-AAG-938
Contract AID/ta-CA-3

Keywords: *Tanzania, Rural areas, Economic development, Bibliographies, Land use, Demography, Socioeconomic status, Finance, *Agricultural economics, Rural sociology, Education, Marketing, Prices, Females, Housing, Developing country application.

The comprehensive bibliography on rural development in Tanzania contains 761 English-language publications, classified by subject area. These works were published mainly during the 1970s. Subject categories include historical perspective on rural development; rural development ideology and policy; physical geography and land use; demography; social stratification and participation; development planning and finance; agricultural and rural development policy and planning; women in development; and ujamaa (villagization), and planned settlement. Other major subject areas fall into the general categories of agriculture, health, education, housing and related infrastructure, rural industry, marketing, and price policy. A list of authors cited and citation numbers are also provided.

PB81-134934 PC A06/MF A01
AMARU IV Cooperative, Inc., Washington, DC.
Alternative and Banking Institute Delivery to Bolivian Campesinos
Final rept.
Wendy DeMegret. 28 Aug 79, 108p AID-PN-AAH-029
Contract AID-511-186

Keywords: Credit, *Bolivia, Agriculture, Financing, *Agricultural economics, Interest, Farms, *Banking, Farmers, Small businesses, Cooperatives, Loans, Financial services, Developing country application.

The report contains a feasibility study of a project to provide alternative, non-banking agricultural credit systems which can respond favorably to the credit needs of Bolivian campesinos (small farmers). The report is based on a six-week inquiry among the clients and personnel of four Bolivian institutions which extend agricultural credit to campesinos, three alternate sources (savings and loan organizations) and one bank. The primary finding of this study is that the fundamental premise of channeling loans to small farmers through alternate, non-banking sources is sound.

PB81-135154 PC A05/MF A01
Ministry of Agriculture and Cooperatives, Bangkok (Thailand). Div. of Agricultural Economics.
Agricultural Sector Analysis in Thailand. Final Report
Jul 79, 99p DAE-CARD SECTOR ANALYSIS SER-16, AID-PN-AAH-110
Contract AID/CM/SA-C-73-19, Grant AID/CSD-2824
Prepared in cooperation with Iowa State Univ., Ames. Center for Agricultural and Rural Development.

Keywords: *Thailand, Developing countries, *Agricultural economics.

This is the final report on the six-year Agricultural Sector Analysis project to improve the ability of the Royal Thai Government (RTG) to make decisions affecting agriculture. Large scale national and regional models that allow comparison of alternatives in policy and developmental programs were constructed and applied. These models provide detailed and operational policy and planning information in order to identify those development potentials/policy alternatives that are complimentary rather than competitive to the economic growth of the country. The models are also used for developing five-year plans in the agricultural sector and are kept operational for continuous analysis of agricultural alternatives and policy inputs. This report contains a description of the five major types of analysis addressed in the project--agricultural sector, rural development, macro-modeling, commodity demand, and transportation and marketing analysis.

PB81-137911 PC A07/MF A01
Skidmore, Owings and Merrill, Boston, MA.
Assessment and Recommendations for Community Water Resources Planning
Oct 80, 132p* OWRT-C-80104-P(8402)(1)
Contract DI-14-34-0001-8402
Prepared in cooperation with Environmental Research and Technology, Inc.

Keywords: *Water supply, *Water resources, *Urban planning, Local government, Water conservation, Water distribution, Shortages, Water consumption, State government, Massachusetts, Water demand, Water allocation(Policy), *Water management, Stoughton(Massachusetts).

This study examined local planning in response to water supply shortages and related water quality and land management factors in a case study suburban town (Stoughton) near Boston, Massachusetts. Following initial survey of local water resource issues in the study town, the study team provided planning and technical assistance to aid the development of a local resource management strategy. A six-step planning process was prepared and tested, based on apparent guidance needs in resource planning techniques. It was concluded that local government appears to be the most appropriate body to deal with local resource management issues, but also that it is often ill-equipped to do so.

PB81-138513 PC A02/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Value Loss of Hardwood Lumber during Air-Drying
Forest Service research paper (Final)
Leland F. Hanks, and Margaret K. Peirsol. 1975, 14p
Rept nos. FSRP/NE-309, NEFES/81-164

Keywords: Lumber, *Drying, Losses, Hardwoods, Market value, Prices, *Wood, Shrinkage, Thickness, Tables(Data), Air drying.

Dry lumber prices were applied to green and air-dried lumber that was measured with a dry board rule. Values were summed by species, lumber grade, and thickness class. Differences between green and air-dried lumber value have been termed value losses and are given in dollars and in percentages. The percentages have been separated into loss due to shrinkage and loss due to degrade. Data for 10 hardwood species are included.

PB81-139222 PC A07/MF A01
California Univ., Berkeley. Earthquake Engineering Research Center.
Strength of Timber Roof Connections Subjected to Cyclic Loads
Polat Gulkan, Ronald L. Mayes, and Ray W. Clough. Sep 78, 137p UCB/EERC-78/17, HUD-0001491
Contract HUD-H-2387

Keywords: *Buildings, Roofs, Timber construction, Construction joints, *Wooden structures, Cyclic loads, Earthquakes, *Earthquake engineering.

The investigations described in this report examined the adequacy of typical timber roof connections used in masonry housing construction in resisting forces developed during earthquake ground motions in the less seismically active areas of the United States. Displacement controlled load tests using both in - plane and out - of - plane forces were performed on five basic types of roof - to - masonry wall connection mockups comprising a total of 19 models. The five types of connections contained load - bearing and nonload - bearing connection details of both gabled truss and flat roof construction. Test results indicated that the connection of the truss rafters to bearing and nonbearing walls was adequate. However, supplementary anchorage devices need to be used for connections employing ledgers, since bolts tend to fail by pulling out of the face shell of the masonry units and ledgers fail easily when subjected to cross grain tension. Graphs, drawings, and photographs are used throughout the report and a total of 19 references are provided. (Author abstract modified).

PB81-139800 PC A02/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Processing Maple Syrup with a Vapor Compression Distiller: An Economic Analysis
Forest Service research paper (Final)
Lawrence D. Garrett. 1977, 16p Rept nos. FSRP/NE-385, NEFES/81-217

Keywords: Economic analysis, *Food processing, Distillation equipment, *Distilleries, Quality control, Evaluation, *Industrial plants, *Maple syrup.

Evaluation of vapor compression distillers for processing maple syrup revealed that they are more energy efficient than conventional evaporators, produce syrup of equal quality, and are effective in reducing total annual processing cost.

PB81-139818 PC A02/MF A01
Economics and Statistics Service, Washington, DC. Economic Development Div.
Hired Farmworker Housing
Staff rept.
Ronald Karnpe. Dec 80, 23 Rept no. AGESS-800812

Keywords: Residential buildings, Farms, *Houses, Market value, Water services, Plumbing, Leasing, Sewage disposal, *Housing, Agricultural workers, Farm workers, Migrant workers.

The typical home of a hired farmworker, compared with a rural farm and nonfarm home, was more likely to have fewer rooms, be part of a multiunit structure (although most were single-unit structures), and be connected to a potable water source and a sanitary sewage system. Farmworkers' homes had lower estimated resale values and rented for less than did rural nonfarm homes but hired farmworker housing were about as likely to have complete plumbing facilities as were rural farm homes. Temporary housing available for migrant workers was typically less desirable than permanent farmworker housing.

PB81-140592 PC A02/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
A Comparison of Four Techniques for Producing High-Grade Furniture Core Material from Low-Grade Yellow Poplar
Forest Service research paper (Final)
Philip A. Araman. 1978, 12p Rept nos. FSRP/NE-429, NEFES/81-161

Keywords: Lumber, *Furniture, Defects, Quality, *Wood, Yield, Cost analysis, Poplar wood.

Four methods of converting low-grade yellow-poplar lumber into high-grade furniture core material (lumber core) were compared. High-grade core material is used in tops, shelves, doors, and drawer fronts and only minor defects are allowed. Three gang-rip first and the conventional crosscut-first manufacturing sequences were evaluated in combination with 1 Common, 2A Common, and 2B Common lumber.

PB81-140885 PC A05/MF A01
International Center for Living Aquatic Resources Management, Manila (Philippines).
Philippine Municipal Fisheries: A Review of Resources, Technology and Socioeconomics
Ian R. Smith, Miguel Y. Puzon, and Carmen N. Vidal-Libunao. 1980, 92p Rept no. ICLARM STUDIES AND REVIEWS-4
Prepared in cooperation with Fishery Industry Development Council, Quezon City (Philippines). Also pub. as ISSN-0115-4389.

Keywords: *Fisheries, *Philippines, Fishing, Production, Sales, Economic development, Marketing, Equipment, Income, Statistical analysis, Tables(Data), Overfishing, Fishing equipment.

Recent research findings related to the technology and socioeconomics of small-scale municipal fishermen in the Philippines and the 'open-access' resources they exploit are reviewed. Evidence is provided of a trend towards overfishing of Philippine coastal waters, and of a willingness among fishermen to consider alternative activities to capture fishing.

PB81-140873 PC A04/MF A01
International Center for Living Aquatic Resources Management, Manila (Philippines).
Food Potential of Aquatic Macrophytes
Peter Edwards. Mar 80, 55p Rept no. ICLARM STUDIES AND REVIEWS-5
Prepared in cooperation with Asian Inst. of Tech., Bangkok (Thailand). Also pub. as ISSN-0115-4389.

Keywords: Food production, *Aquatic plants, *Plants(Botany), *Algae, Ferns, Protein, Feeding stuffs, Nutritive value, *Food supply, Fertilizers, Aquaculture.

A review is presented of the pathways in which aquatic macrophytes may be involved in the food production process, directly as human food, as livestock fodder, as fertilizer (mulch and manure, ash, green manure, compost, biogas slurry), and as food for aquatic herbivores, such as fish, turtles, rodent and manatees. An attempt is made to identify the strategies which may have the greatest potential at present. The following research areas are suggested as worthy of attention: protein content and yield of Ipomoea aquatica and Neptunia oleracea, two vegetables which grow year round in the tropics and can be propagated from cuttings; protein content and yield of various types of duckweed in the tropics as a function of different concentrations of various organic wastes; Azolla and filamentous blue green algae as biofertilizers; composting aquatic macrophytes and the use of the compost as an organic fertilizer in fish ponds; aquatic macrophytes in biogas production and the use of the slurry as an organic fertilizer in fish ponds, and the feasibility of stocking herbivorous fish in irrigation systems with large aquatic macrophyte populations.

PB81-141335 PC A02/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Improved Sanitation Practice for Control of Dutch Elm Disease
Forest Service research paper (Final)
Jack H. Barger. 1977, 8p Rept nos. FSRP-NE-386, NEFES/81-218

Keywords: *Plant diseases, Sanitation, Surveys, Dutch elm disease, Disease control, Ulmus americana.

In Detroit, Michigan, 12 plots, each containing about 600 American elm trees, Ulmus americana L., were subjected for 3 years to intensive and conventional sanitation treatments to control Dutch elm disease. In the intensive treatment, three disease surveys were conducted each year; each followed by tree removal within 20 working days. In the conventional treatment, one survey was conducted each year, and diseased trees were removed in late fall and winter. Results showed that the intensive sanitation treatment was significantly better than the conventional treatment each year.

PB81-142481 PC A07/MF A01
Rezek, Henry, Meisenheimer and Gende, Inc., Libertyville, IL.
Septage Management
Final rept. Jul 75-Apr 77
Joseph W. Rezek, and Ivan A. Cooper. Aug 80, 140p EPA-600/8-80-032
Contract EPA-68-03-2231

Keywords: Sludge disposal, Design criteria, Management planning, Substitutes, Performance evaluation, *Sewage disposal, Equipment, Sewage treatment, *Septic tanks, Sludge treatment, Land disposal, State of the Art.

This report presents state-of-the-art information for implementing cost effective and environmentally sound solutions to the nationwide problem of septic tank sludge (septage) treatment and disposal. Current hauler practices, septage characterization, and regulatory control are presented. Design concepts of full scale and pilot installations are presented for land disposal schemes, for separate septage treatment processes in areas with sufficient septage volumes to support such a facility, and for septage disposal at sewage treatment plants (STP). Actual system costs and environmental and socio-economic acceptability for many actual and proposed treatment schemes are detailed to assist in the selection of the best treatment scheme for a particular locale at the least possible cost. A significant bibliography is presented which embodies most of the pertinent U.S. references on the subject.

PB81-144552 PC A14/MF A01
Transportation Research Board, Washington, DC.
Transportation Technology Support for Developing Countries. Compendium 3. Small Drainage Structures
1978, 325p Rept no. ISBN-0-309-02810-8
Contract AID/OTR-C-1591

Keywords: Highway planning, Drainage, Developing countries, Design, Construction, Maintenance, Hydraulics, Channel flow, Aerial surveys, *Transportation, *Roads, Rural transportation.

Low volume rural roads are perhaps the most crucial element of the transportation system of developing countries. While traffic on such roads generally amounts to just 5 to 10 vehicles per day and seldom as many as 400 (by definition), these roads are often the only link-up remote areas have to health and educational services, information sources, and marketplaces. This document is the third in a series of compendiums designed to assist project planners and technical and administrative personnel with the planning, design, construction and maintenance of low volume roads. This particular compendium focusses on small drainage structures for such roads. It contains eight technical reports, reprinted in full or excerpted, which present some information on general drainage design, but primarily provide technical information on the design and installation of culverts and associated structures.

PB81-144560 PC A10/MF A01
Transportation Research Board, Washington, DC.
Transportation Technology Support for Developing Countries. Compendium 4: Low-Cost Water Crossings
1979, 203p Rept no. ISBN-0-309-02816-7
Contract AID/OTR-C-1591

Keywords: Highway bridges, Highway planning, Developing countries, Technology, Wooden structures, Design, Construction, *Transportation, *Roads, Rural transportation.

This compendium is the fourth product of the Transportation Research Board's project on Transportation Technology Support for Developing Countries under the sponsorship of the U.S. Agency for International Development. The objective of this book is that it provide useful and practical information for those in developing countries who have direct responsibility for low-cost water crossings.

PB81-144578 PC A10/MF A01
Transportation Research Board, Washington, DC.
Transportation Technology Support for Developing Countries. Compendium 5: Roadside Drainage
1979, 218p Rept no. ISBN-0-309-02820-5
Contract AID/OTR-C-1591

Keywords: Highway planning, Drainage, Developing countries, Design, Technology, Channel flow, Hydrau-

lics, Grading(Earthworking), *Transportation, *Roads, Rural transportation.

This compendium is the fifth product of the Transportation Research Board's project on Transportation Technology Support for Developing Countries under the sponsorship of the U.S. Agency for International Development. The objective of this book is that it provide useful and practical information for those in developing countries who have direct responsibility for roadside drainage activities.

PB81-144586 PC A11/MF A01
Transportation Research Board, Washington, DC.
Transportation Technology Support for Developing Countries. Compendium 6: Investigation and Development of Materials Resources
1979, 249p Rept no. ISBN-0-309-02821-3
Contract AID/OTR-C-1591

Keywords: Highway planning, Construction materials, Developing countries, Soil classification, Aerial photography, Remote sensing, Soil science, Natural resources, Terrain, South Africa, Subsurface investigations, Mines(Excavations), *Transportation, *Roads, Rural transportation.

A key link in rural transportation systems in developing countries are low volume roads--roads which generally carry only 5-10 vehicles per day and seldom as many as 400. This document is one in a series of compendiums designed to improve the access of LDC and donor agency road planners to significant literature on various aspects of low volume road technology. The eight texts selected for inclusion in this compendium focus on the investigation and development of material resources, within LDC's, that would be used in the construction of such roads. Topics covered by the texts include the basic requirements for and comparisons of various soil classification systems, the evaluation of soil patterns, including the use of aerial photography and remote sensing, methods for materials inventory, and technologies for development of materials deposits.

PB81-144594 PC A15/MF A01
Transportation Research Board, Washington, DC.
Transportation Technology Support for Developing Countries. Compendium 9: Control of Erosion
1979, 350p Rept no. ISBN-0-309-02976-7
Contract AID/OTR-C-1591

Keywords: Highway planning, Erosion control, Developing countries, *Soil erosion, Drainage, Water erosion, Vegetation, Rain erosion, Deserts, Rural areas, *Roads, Construction, Technology, Highway bridges, Hydraulics, *Transportation, Rural transportation.

The compendium is the ninth product of the Transportation Research Board's project on Transportation Technology Support for Developing Countries under the sponsorship of the U.S. Agency for International Development. The objective of this book is that it provide useful and practical information for those in developing countries who have direct responsibility for control of erosion. Feedback from correspondents in developing countries will be solicited and used to assess the degree to which this objective has been attained and to influence the nature of later products.

PB81-144925
(Order as PB81-144909, PC A06/MF A01)
Museo Nacional de Historia Natural, Montevideo (Uruguay).
Developments in South American Squid Fisheries
Marcelo Juanico. Aug 80, 6p NOAA-80112805-2
Included in Marine Fisheries Review, v42 n7-8 p10-14, Jul-Aug 80.

Keywords: Squids, Marketing, *South America, *Fisheries, Yield, Argentina, Uruguay, Tables(Data), Reprints, Illex argentinus.

The only important squid catches in South America are the Argentinian ones, and to a much less extent those of Uruguay. Estimates of squid potential yields near the continent will be available at short term only on this resource (Illex argentinus). The lack of suitable data on other South American squid stocks makes impossible estimating the feasibility of a future development of this kind of fishery.

PB81-145096 PC A08/MF A01
Arizona Univ., Tucson. Coll. of Medicine.
Development and Health in the Tropics. Part I. West Africa
Frank L. Lambrecht. 1980, 168p

Keywords: *Africa, Environments, *Ecology, Agriculture, Animal husbandry, Conservation, *Environmental impacts, Diseases, Parasitic diseases, Public health, Sociology, Housing, Sanitation, Nutrition, Environmental health.

The natural ecological zones in Africa are the result of long evolutionary development with completely interrelated fauna and flora components. The upset of only a few elements in these ecosystems in many instances results in a gradual breakdown of relationships, followed by degradation of the system. Bushfire and floods, the destruction of forest through shifting cultivation, overgrazing of grasslands, followed by large scale soil erosion, have depleted large areas, turning them into marginal lands of poor agricultural or pastoral potential. Moreover, these lands often develop into acacia bushland suitable to the tsetse fly, carrier of human and animal trypanosomiasis which further decreases the opportunity for reoccupation.

PB81-145338 PC A08/MF A01
AMARU IV Cooperative, Inc., Washington, DC.
Appropriate Technology for the Bolivian Campesino: A Background Social Feasibility Study
Leslie A. Brownrigg, Inge Maria Harman, and Roger Neil Rasnake. 2 Nov 79, 162 AID-PN-AAH-032
Contract AID-511-193-T

Keywords: *Technology assessment, *Bolivia, Social organization, Agricultural engineering, *Agriculture, *Food processing, *Energy, *Water use, *Housing, Demography, Population(Statistics), Migration, Households, Organizations, Production, Rice, Corn, Public health, Social change, Culture(Social sicences), Resource allocation, Food processing, Farmers, Developing country application.

The report presents research data relevant to the design of an appropriate technology project in Bolivia. Parts II and III of the report are studies of the Yura and Huaytu communities in Potosi and Santa Cruz, respectively. These two sections are divided into discussions of social organization, current technology and production, and recommendations for the proposed appropriate technology project. Recommendations concerning specific types of appropriate technology to be promoted are presented by subject area-agriculture, food processing, energy, sanitation, diet, water, and housing. Specific technologies for these subject areas are included in the appropriate technology sections of the Yura and Huaytu community studies. A 21-item bibliography of references cited (1951-1978) is appended to the report.

PB81-145385 PC A10/MF A01
San Jose State Univ., CA. Dept. of Instructional Technology.
Instructional Technology and Learning Resource Center-Based Community Education
James W. Brown. 15 Dec 77, 202p AID-PN-AAH-019
Grant AID/1A-G-1169

Keywords: *Education, *Latin America, Communities, Developing countries, Professional personnel, Paraprofessional personnel, Instructors, Surveys, Bibliographies, Mass media, Developing country application.

The report presents excerpts from a survey of literature and descriptions of nonformal community education activities involving specific uses of media for various educational and informational purposes. In addition, recommendations and media utilization techniques and procedures having special application to the Learning Resource Center-Based Community Education Project (LRC-BCES) are also included. It is intended that this paper assist paraprofessional and professional personnel who may be employed in the LRC-BCES programs in Latin America. Though not exhaustive, the survey of literature consists of a fair sample of journalistic opinions, reports of actual experience, and, where available, of field-based objective studies of several different kinds. Three appendices are provided to facilitate the researcher's further study of this topic. Finally, a bibliography of 200 entries (1964-1978) lists all items consulted in the preparation of this study.

PB81-145656 PC A04/MF A01
Steedman (Charles), Ann Arbor, MI.
Cameroon Renewable Energy: Project Possibilities
Charles Steedman. 1 Aug 79, 60p AID-PN-AAH-100
Contract AID/afr-C-1542

Keywords: *Cameroon, *Solar energy, Wind power generation, Pyrolysis, Planning, *Wind energy, *Wood stoves, Renewable energy sources, *Energy source development, Wood burning appliances, Photovoltaic conversion, *Bioconversion.

This study identifies the actions necessary to assess Cameroon's energy needs, and makes recommendations to a design team for a USAID project to promote renewable energy sources. The author describes current renewable energy source activities in Cameroon, discusses the individual elements of a possible energy development program, and suggests prototype renewable energy technologies for field application.

PB81-145666 PC A05/MF A01
Kentucky Univ., Lexington. Dept. of Agricultural Economics.
The Agriculture Sector in Thailand: A Brief Assessment
Russell H. Brannon. Apr 78, 90p STAFF PAPER-66, AID-PN-AAH-099
Contract AID/fe-261

Keywords: *Agricultural economics, *Thailand, Economic analysis, Land titles, Income, Employment, Prices, Technology assessment, Production, Productivity, Fisheries, Forestry, Land use, Developing country application.

The paper assesses the current state of the agricultural sector in Thailand. The agricultural sector is described in an historical and situational context by the following eleven aspects: (1) the role of agriculture within the total economy; (2) the land resource base; (3) size of holding an land tenure patterns; (4) income and income distribution; (5) rural employment; (6) agricultural technology; (7) agricultural prices; (8) agricultural production; (9) forestry and fisheris; (10) agricultural exports; and (11) constraints to increased agricultural production and productivity. An appended list of useful references contains 44 entries (1963-1977) and consists of many statistical, agricultural surveys.

PB81-145674 PC A07/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Technical Change and the Small Farmer in Hausaland, Northern Nigeria
African rural economy paper
David W. Norman, David H. Pryor, and Christopher J. N. Gibbs. 1979, 141p AREP-21, AID-PN-AAG-951
Contract AID/afr-C-1260
Prepared in cooperation with Kansas State Univ., Manhattan. Dept. of Economics, and Ahmadu Bello Univ., Zaria (Nigeria). Inst. for Agricultural Research.

Keywords: Technology innovation, *Agricultural economics, *Nigeria, Labor estimates, Fixed investment, Income, Capital, Land, Cotton plants, Corn plants, Grain sorghum plants, Profits, Return on investment, Land use, Agriculture, Farmers, Hausaland(Nigeria).

The study focuses on the economics, profitability, improvement, and implementation of small farming in Hausaland. The paper presents a comparative analysis of the economics of traditional small-farm agriculture in Sokota, Zaria, and Bauchi, three areas in Hausaland; assesses the profitability and relevance of improved technological package for cotton, sorghum, and maize; and discusses the implications of the results for research workers and policy makers in Hausaland and in the Sahelian countries with a similar ecological base.

PB81-145823 PC E05/MF A01
National Bureau of Standards, Washington, DC. National Engineering Lab.
Fire Safety of Wood-Burning Appliances, Part 1: State of the Art Review and Fire Tests, Volume 1 and Volume 2
Final rept.
Richard D. Peacock, Efrain Ruiz, and Roberto Torres-Pereira. Nov 80, 80p Rept no. NBSIR-80-2140

Sponsored in part by Department of Energy, Washington, DC.

Keywords: *Stoves, *Wood, *Fire safety, Fire tests, Chimneys, Flues, Heating equipment, Heat transfer, Wood burning stoves.

A series of 18 full-scale tests was conducted in an instrumented test room using five different wood-burning appliances. These tests were designod (1) to establish typical operating conditions including temporatures on the appliances, chimneys, and adjacent combustible surfaces; (2) to study the effects of a variety of combinations of appliance design, clearance to combustibles, and room construction on temperatures on adjacent combustible surfaces; and (3) to compare these measured values with theoretical predictions of wall surface temperature. Additional tests were conducted to compare a standardized fuel source with typical oak logs. A review of literature related to wood-heating safety included in this study revealed that current codes are based on data almost 40 years old. The results of these tests point out some areas where the codes should be modernized to accurately reflect the newor appliances and construction techniques.

PB81-147068 PC A02/MF A01
North Central Forest Experiment Station, St. Paul, MN.
How to Diagnose Black Walnut Damage
Forest Service general technical rept. (Final)
Barbara C. Weber, Robert L. Anderson, and William H. Hoffard. Jan 80, 25p Rept no. FSGTR-NC-57

Keywords: Nut trees, Forestry, Damage, Manuals, Insects, *Walnut, *Plant diseases, Wildlife, Deer, Pest control.

The report presents a key to common insect, disease, animal, and other damages to black walnut. Also it includes illustrations of many of the damage types and descriptions of the causal agents. Preventive or control recommendations are made where appropriate.

PB81-147704 PC A17/MF A01
Costa Rica Univ., San Jose. Centro para Investigationes en Granos y Semillas.
Seminario Internacional Sobre Tecnologia de Semillas para Centroamerica, Panama y el Caribe (International Seminar on Seed Technology for Central America, Panama, and the Caribbean)
Albert H. Boyd, Ronald Echandi Z, J. E. Douglas, W. Couvillion, and J. L. Faeth. Aug 78, 400p AID-PN-AAG-754
Text in Spanish. Library of Congress catalog card no. 79-87957. Prepared in cooperation with Mississippi State Univ., Mississippi State. Seed Technology Lab.

Keywords: *Seeds, Harvesting, Storage, Farm crops, *Central America, *Panama, *Caribbean, Developing country application.

This document, written completely in Spanish, contains the proceedings of a two week international seminar on seed technology for Central America, Panama and the Caribbean. The seminar was sponsored by the Grain and Seed Research Center of the University of Costa Rica and the Seed Technology Laboratory of Mississippi State University, and was held in August, 1978. The purpose of the gathering was to develop a better comprehension of seed technology theory and to increase the participants' practical knowledge in the areas of seed production, processing, analysis, drying, storage, and distribution, including important considerations of a socioeconomic nature. In order to achieve these objectives, 75 hours of conferences and practical workshops were conducted in the areas of: (1) the organization and development of a seed program; (2) the fundamentals of production harvesting, analysis, processing, storage, distribution, and marketing; and (3) analysis of the economic feasibility of the different program phases and their administration. This volume begins with an overview of the seminar, its objectives, structure, topics covered, schedule, participants, and the professors who led the sessions. Next, 20 conference papers are presented which cover the whole spectrum of topics addressed during the two week proceedings. The concluding section reviews some of the practical workshops which took place in laboratory and in processing plant settings. A bibliography of books and reference works for seed specialists is appended.

PB81-148983 PC A05/MF A01
Public Health Service, Washington, DC. Office of International Health.
Selected Bibliographies and State-of-the-Art Review for Health Manpower Planning
R. J. Staff. 1979, 83p DHEW/PUB/PHS-79-50092, AID-PN-AAH-123
Prepared in cooperation with Plog Research, Inc.

Keywords: Bibliographies, Developing countries, Medical personnel, Manpower utilization, Rural areas, Reviews, Abstracts, Assessments, Foreign countries, *Health manpower, State of the art, *Health planning, Health services.

This literature review and selective, annotated bibliography, the third volume in the International Health Planning Series, contains nearly 400 references in the field of health manpower planning in developing countries. The review of literature is organized into three categories, the assessment of supply, demand, and balance behaviors. Each category is further divided into specific topics, accompanied by a list of authors published on that topic, which is contained in a subsequent chapter. An assessment of supply behavior includes topics analyzing the supply of manpower to the health field. Topical discussion on physicians, nurses, midwives, health teams, technicians, dentists, health center staff, medical education, health training, and productivity is also included. Assessment of demand behavior includes topics of demand analysis and projection, and economic constraints. Finally, the assessment of balance behavior, one author's term for administration and management, deals with organization, distribution, access utilization, planning, and evaluation. The selected bibliography contains 224 entries presented alphabetically. The dates of all publications range from 1958 through 1978.

PB81-149130 PC A03/MF A01
Neushul Mariculture, Inc., Goleta, CA.
Experimental Macroalgal Mariculture
Quarterly rept. no. 5, 1 Jul-30 Sep 80
M. Neushul. Nov 80, 40p NSF/RA-800335
Grant NSF-PFR79-11715

Keywords: *Algae, *Aquaculture, *Coasts, Irrigation, Plant growth, Fertilizers, Plant nutrition, Oceanographic data, North Pacific Ocean, California, Macrocystis.

Recent efforts and the continuing environmental monitoring of oceanographic conditions are reported. The growth of farmed macroalgae has been enhanced by employing nutrient irrigation. Growth rates for the agarophyte, Gelidium, were maximally 1.26 percent/day for fertilized plants during the low-nutrient period. These plants were provided with 0.18gm of fertilizer per day per plant. This is the highest yield obtained to date for nutrient irrigated plants. The growth of Macrocystis was very rapid. Plants grew at 2.9 to 3.8 percent per day. The seed stock was obtained from stored gametophytic cultures in the laboratory. It is now comparatively easy to make controlled crosses and propagate, plant, and grow Macrocystis in the sea.

PB81-149619 PC A09/MF A01
Ministry of Agriculture and Cooperatives, Bangkok (Thailand). Div. of Agricultural Economics.
National Crop Model of Thailand
Arthur L. Stoecker. Mar 79, 200p DAE-CARD SECTOR ANALYSIS SER-15, AID-PN-AAH-112
Contract AID/CM/SA-C-73-19, Grant AID/CSD-2824
Prepared in cooperation with Iowa State Univ., Ames. Center for Agricultural and Rural Development.

Keywords: *Thailand, *Agricultural economics, Developing countries, Planning, Food supply, Growth, Economic factors, Surveys, Forecasting, *Crops, Foreign technology.

The purpose of this report is to provide a semi-technical description of the crop model, the assumptions and the results of a study which provided guidelines for Thailand's Fourth Five-Year Agricultural Development Plan. The study is primarily concerned with the productive capacity of Thai agriculture relative to food needs of a growing population and relative to alternative levels of exports. Problems of income and employment are further compounded by a declining area of unexploited croppable land.

PB81-150476 PC A06/MF A01
Accion International, Cambridge, MA.
Rural Development in Costa Rica
Jeffrey Ashe. c1978, 111p Rept no. ISBN-0-89192-194-X

Keywords: Rural areas, Farm management, *Costa Rica, Farms, *Agricultural economics, Production, Agricultural products, Farm processing, Industries, Land use, *Employment.

The study finds that small farms generate between three and four times more employment per hectare than large farms and are generally as productive as medium and large farms. This points the way for a program aimed at intensified agriculture production, primarily by moving away from using land for pasture to use for annual and perennial crops and by encouraging technologies appropriate for efficient production on the smaller farms. It is essential that this intensified agricultural production be complemented with small-scale industries throughtout the rural areas, especially those which process the produce of small farms, thus insuring steady markets and better prices. The report is divided into chapters on Population and Migration, Employment, Land Use, Land Distribution and Agricultural Production.

PB81-150484 PC A05/MF A01
Accion International, Cambridge, MA.
Microbusiness and Employment in Central Maine: A Summary
John C. Hammock, and Gerard R. Dodd. c1979, 77p

Keywords: *Employment, Maine, Unemployment, Marketing, Subsidies, Economic assistance, Salaries, Fringe benefits, Credit, Technical assistance, Opinions, Central Region(Maine), *Small businesses, Entrepreneurship.

In spite of unprecedented growth in national development, the more isolated urban and rural areas of the United States continue to face stubborn problems of unemployment and underemployment, increased dependence on government subsidies and the flight of skilled laborers, entrepreneurs and youth to the large cities. This study explores micro-business marketing, employment, salaries and benefits, credit use, credit needs, technical assistance, and opinions of micro-business owners.

PB81-150682 PC A06/MF A01
Accion International, Cambridge, MA.
Assisting the Smallest Scale Economic Activities of the Urban Poor. PISCES: Program for Investment in the Small Capital Enterprise Sector Phase I
Jeffrey Ashe. 1980, 114p

Keywords: Low income groups, Urban areas, Developing countries, Economic assistance, Credit, Community development, Economic development, Entrepreneurship, *Small businesses, Industrial development.

The need for assistance to the smallest of entrepreneurs, many of whom could apply these resources profitably, is clear. However, without an understanding on the part of donors of this group's special circumstances, constraints, and potential, the smallest of entrepreneurs will almost certainly never receive the wherewithal to help themselves. This report examines the characteristics of micro-enterprises, paying close attention to their role and importance in the urban economy. It then classifies methods of assisting these enterprises and describes the projects observed. Finally, the report summarizes the lessons learned about direct assistance methods and discusses their implications for donors and practitioners.

PB81-150716 PC A03/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Firewood Crops: Shrub and Tree Species for Energy Production
Final rept.
1980, 50p* Rept no. CIR/BOSTID-80/27
Contract AID/csd-2584
Library of Congress catalog card no. 80-83796.

Keywords: *Wood, *Fuels, Developing countries, Trees(Plants), Shrubs, *Forestry, Indexes(Documentation), Tropical regions, Arid land, Semiarid land, Descriptions, Photographs, Listings.

More than one-third of the world's population depends on wood for cooking and heating. Eighty-six percent of all the wood consumed annually in the developing countries is used for fuel, and of this total at least half is used for cooking. In the face of global concern over the dwindling supply of firewood, the rate of forest decimation to provide basic human necessities in developing countries is alarming. This report suggests potentially significant fuelwood candidates for introduction to suitable environments. Primary emphasis is on species suitable for growing firewood for individual family needs. However, species suited to plantation cultivation for fueling small industrial factors, electric generators, and crop driers are also considered.

PB81-151185 PC A06/MF A01
ACTION/Peace Corps, Washington, DC.
Rice Production: A Training Manual and Field Guide to Small-Farm Irrigated Rice Production
Information collection and exchange reprint series
Michael L. Morris. Jul 80, 104p Rept no. REPRINT R-40

Keywords: Cultivation, Rice plants, North Africa, Manuals, *Irrigation, Plant growth, Morphology, Plant reproduction, Fertilizers, Seeds, Pest control, Plant diseases, Weed control, Harvesting, Storage, Drying, *Rice, *Sierra Leone.

This manual presents a simple, step-by-step description of irrigated rice production in Sierra Leone. It is geared specifically to the role and needs of Peace Corps Volunteers. Placed in rural areas throughout the country, Volunteers work with local farmers as advisors, co-workers, and friends in helping introduce a new farming technology: water control agriculture. As extension agents, their role includes surveying undeveloped swamps, designing effective water control systems, and teaching farmers productive and appropriate rice cultivation practices.

PB81-151318 PC A07/MF A01
ACTION/Peace Corps, Washington, DC.
Primary School Arts and Crafts: Developing Manual Skills, Lesson Plans. Classes I thru VI
Information collection and exchange reprint series
Mildred Douglass. Oct 80, 135p Rept no. REPRINT R-37

Keywords: Crafts, Instructional materials, *Children, Creativity, Manuals, National government, *Education, Peace Corps.

This book, a lesson plan manual, is designed to be of assistance to primary school teachers who have had little training in Arts and Crafts, and for use in teacher training colleges. The book is not meant to be rigid or exhaustive. Lessons have been suggested for class levels in groups of I to III and IV to VI or for all classes. However, if some lessons appear too difficult or too simple for the suggested classes, they may be used in any manner the teacher chooses. For children who have never had any craft work, the simplest lessons would not be too easy. The teacher should feel free to improvise, change or vary the lessons.

PB81-151425 PC A05/MF A01
National Bureau of Standards, Washington, DC. Office of International Relations.
Standardization and Measurement Services in the Sudan
Final rept.
H. Steffen Peiser, Benjamin M. Gutterman, Gain L. Louis, Joan M. Pring, and John K. Taylor. Aug 80, 90p Rept no. NBSIR-80-2020
Grant PASA-TA(CE)-5-71

Keywords: *Sudan, *Standardization, Measurement, Services, Units of measurement, Standards, Drug industry, Food industry, Cotton fabrics, Textile industry, Corporations, Government, Metrology.

A ten-member international team advisory to the Government of the Sudan's Ministry for Industry on Sudanese standardization and measurement services was organized by the U.S. National Bureau of Standards. The team split up into smaller specialist groups to survey the application of standardization and measurement technology to the following sectors: food industries, weights and measures (in retail markets), chemical industries standards and quality control, and textile (cotton). Detailed notes on the visit to 48 Sudanese organizations in industry and Government are reported.

PB81-151987 PC A03/MF A01
Ghana Univ. Medical School, Accra.
An Analysis of the Characteristics of Households, Household Size, Household Heads and the Relationship within the Households
G. M. K. Kpedekpo, K. Asuming, S. N. Blumenfeld, F. K. Wurapa, and D. W. Belcher. Mar 75, 31p MONO SER-8, AID-PN-AAH-261
Prepared in cooperation with California Univ., Los Angeles. School of Public Health.

Keywords: *Ghana, Education, Characteristics, Surveys, Rural areas, Ethnic groups, Statistical data, Demography, *Birth control, *Health, Foreign technology, Households, Health statistics, Marital status.

This analytical survey, containing extensive data collected on the patterns of home life in Ghana, has been compiled for use as a comprehensive rural health and family planning project. The Danfa region, in which this project is conducted, has been divided into four survey areas and includes the survey of approximately 50,000 rural inhabitants ranging 10 to 50 miles from Accra. Topics of the demographic survey include: characteristics of households and houses; relationships within the households; characteristics, and marital and occupational status of heads of households; and characteristics of heads of households of selected ethnic groups by religion, occupation, and relationship to head of household. Statistics are presented in tabular form by subarea, with short, narrative summaries analyzing the results under each topic. Extracted from the concluding section summarizing the main findings, it was demonstrated that while the average size of a household varies little between the four project areas (4.1 in Area II to 5.4 in Area IV), the average number of persons per house varies considerably, ranging from 5.9 persons per house in Areas II and III to 13.0 persons per house in Area IV. Additionally, farming and fishing are the primary occupations for all areas, but these activities vary in proportion from one area to the next. Heads of households tend to be male in both single and multiple member households; female heads of households suffer more frequently from divorce and widowhood than their male counterparts.

PB81-152076 PC A02/MF A01
Secretaria de Asentamientos Humanos y Obras Publicas, Mexico City.
Los Caminos Rurales en Mexico (Rural Roads in Mexico)
Raul Salinas de Gortari, and Ricardo Bahena Brito. Jul 80, 22p
Text in Spanish.

Keywords: *Roads, Rural areas, Construction, *Mexico, Developing country application.

The content of this paper represents a summary of the work done by La Direccion General de Caminos Rurales, Secretaria de Asentamientos Humanos y Obras Publicas, Mexico. It describes different operational phases in the rural roads construction developed in Mexico.

PB81-152092 PC A03/MF A01
Rand Afrikaans Univ., Johannesburg (South Africa).
Motivational Structure and the Transfer of Technology
Hilgard S. Schoeman. Feb 79, 39p
Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador). Proceedings of the International Symposium of Engineering Held at UCA on February 19-23, 1979.

Keywords: *Technology transfer, Developing countries, Farm crops, *South Africa, Interpersonal relations, Family relations, Developing country application.

The paper describes a number of case studies drawn largely from the self-governing territory of Garzankulu (South Africa). It outlines and defines the motivational structure of rural Tsonga. The Garzankulu data shows that development experts, particularly those concerned with the transfer of technology require an adjustment of perspectives. It underlines that the transfer of technology should not be a conflict between different kinds of technology, but a scientifically programmed fusion of them.

PB81-152258 PC A02/MF A01
Instituto Centroamericano de Investigacion y Tecnologia Industrial, Guatemala City.
Aprovechamiento del Falso Fruto del Jocote Maranon (Utilization of the Pseudofruit of the Cashew Trees)
Ricardo Garcia. Jul 80, 21p
Text in Spanish.

Keywords: *Nut, *Central America, Plant growth, Industries, Developing country application, Cashew trees.

The document is a summary of the work done by the Instituto Centroamericano de Investigacion Aplicada, in coordination with El Banco Centroamericano de Integracion Economica, aimed to promote the growth of cashew trees in Central America. It also studies the possibility to industrialize the products from cashew trees, favoring small scale industries and farmers.

PB81-153157 PC A05/MF A01
Superintendencia do Desenvolvimento da Pesca, Brasilia (Brazil).
Estudo Sobre a Vegetacao Aquatica e Marginal Relacionada com a Vida dos Peixes (Study on Aquatic and River Margins Vegetation Related to Fish Life)
Jose Elias de Paula. 1978, 83p
Text in Portugese.

Keywords: *Fishes, *Fisheries, *Aquatic plants, Feeding stuffs, Brazil, Foreign technology.

This study is part of the Ichthyology Research Project of the Araguaia-Tocantis region. The objective was to identify the aquatic and river margins species which are directly or indirectly related to the fish life, specifically as a source of food for them. In conjunction with the vegetation studies, the stomach contents of 27 fish were analyzed. The results indicate that the vegetation along the river margins is as important as the aquatic vegetation for the fish.

PB81-153165 PC A03/MF A01
Companhia Estadual de Tecnologia de Saneamento Basico e de Defesa do Meio Ambiente, Sao Paulo (Brazil).
Saneamento em Situacao de Emergencia (Health Care in Case of Emergency)
Arlindo Philippi, Jr. 1976, 31p
Text in Portuguese.

Keywords: Developing countries, *Brazil, Public health, Food contamination, Floods, Explosions, Radiation, Earthquakes, *Health care delivery, Emergency health services, Health care.

After a definition of an emergency situation this document describes their main causes such as floods, explosions, radiation, earthquakes and the like, considering the number of persons involved, loss of shelter, damages, interruption of water services, etc. It offers solutions--the first step being the establishment of a Headquarters for medical sanitary assistance. The Public Health efforts must count with the assistance of Air Forces and with University students, and emphasizing the choice of a water source and control of pollution of the same. Control of vectors and contamination of food are included.

PB81-154353 PC A04/MF A01
ACTION/Peace Corps, Washington, DC.
How to Make Tools
Information collection and exchange reprint series
Per Christiansen, and Bernard Zubrowski. Jul 80, 58p Rept no. REPRINT R-35

Keywords: *Hand tools, Fabrication.

Fabrication of simple hand tools from available materials is described.

PB81-154619 PC A09/MF A01
Ocean Management Associates, Saunderstown, RI.
Marine Plant Biomass for Alcohol Fuels
Francis X. Cameron, Henry S. Parker, J. M. Gates, and Kevin Klarnet. Mar 80, 195p NAFC-80-12

Keywords: Biomass, *Aquatic plants, *Fuels, Cost analysis, Socioeconomic status, *Ethanol, Sugars,

Substitutes, Cultivation, Economic analysis, *Alcohols, Alcohol fuels, Gasohol, Energy sources, Seaweeds, State of the art.

This report provides a basic evaluation of the potential of marine plants as an economical source of substitute fuels. The potential of different species and cultivation techniques for marine biomass production will be evaluated and compared. The analysis will consist of a review of the cultivation and harvesting technology, the production costs and the expected biomass yield. Legal and institutional constraints as well as environmental and socio-economic impacts will also be evaluated.

PB81-156127 PC **A04/MF A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Direct Farmer-to-Consumer Marketing Program Should Be Continued and Improved
Report to the Congress.
9 Jul 80, 52p Rept no. CED-80-65

Keywords: *Marketing, Sales management, Agricultural products, *Food, Farm management, Consumers, Distribution systems, Prices, Sales, Farmers, Energy consumption.

Direct farmer-to-consumer sales offer additional income opportunities for farmers and fresher, cheaper food for consumers. Direct marketing may also reduce energy consumption, help preserve farmland, and decrease the reliance of many areas on out-of-region food sources. The Federal Direct Marketing Program has encouraged direct sales, but it is limited. As it ends in 1980, questions will remain about its overall impact and potential to improve farm viability, consumer satisfaction, and resource use.

PB81-159105 PC **A02/MF A01**
Costa Rica Univ., San Jose.
Trilladora de Frijol de Superficie Suave (Bean Threshing Machine of Soft Surface)
Manuel Antonio Murillo. Jul 80, 17p
Text in Spanish.

Keywords: *Agricultural machinery, Beans, Construction, Design, *Costa Rica, Developing country application, Threshing machines.

The document describes the design and construction of a Bean Threshing Machine which is easy to build, and simple to operate, at a low cost. This machine is versatile, it has been tested with success in the threshing of some other grains such as rice, soja and sorghum, in Costa Rica.

PB81-159402 PC **A02/MF A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Modelo Matematico para Simulacion de Secado y Almacenamiento de Granos (A Mathematical Model for the Simulation of the Drying and Storage of Grain)
Jose Gerardo Merino Martell. Feb 79, 22p
Text in Spanish.

Keywords: *Grains(Food), *Drying, Storage, Mathematical models, *El Salvador, *Food storage, Developing country application.

The report describes a mathematical model for the simulation of the drying and storage of grain.

PB81-159410 PC **A03/MF A01**
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Potencial de la Ganaderia Tropical Tecnificada Bajo el Sistema del Pastoreo Rotativo Intensivo - Repercusion Social Y Economia (Potential of Tropical Breeding of Cattle by the Technical System of Intensive Rotation of Pastures)
Enrique Alvarez, Francisco Lino Osegueda, and Jauricio Rodriguez. Jul 80, 27p
Text in Spanish.

Keywords: *El Salvador, Beef cattle, Production, Management, Grassland, *Animal husbandry, Developing country application.

This document presents a 28 year experience in beef production at Hacienda el Jobo, Departmento of Sonsonate, El Salvador. The document describes how the use of pasture maximized yields, and how appropriate management was implemented.

PB81-159436 PC **A03/MF A01**
Cornell Univ., Ithaca, NY.
The Functional Properties of a Legume Seed (Phaseolus Vulgaris) Protein Concentrate
Guillermo Sada, and Frank V. Kosikowski. Feb 79, 38p
Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador). Proceedings of the International Symposium of Engineering (2nd) Held at UCA on February 19-23, 1979.

Keywords: Beans, Food composition, Food preparation, *Proteins, Food analysis, Nutritive value, *Food fortification, *Leguminous plants, *Latin America, Developing country application.

The present study was aimed at the production of a protein concentrate from a typical legume seed (Phaseolus Vulgaris) and the study of its functional properties. The leguminous seeds, particularly beans (Phaseo lus) constitute traditional foods in the diet of population of tropical and subtropical areas. They are very important sources of protein in the diet of Latin american populations, providing from 20 to 30 percent of the total protein intake, and are second only to corn as a stable food.

PB81-159782 PC **A02/MF A01**
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Staff Summary Report: Workshop on Postharvest Food Conservation Held at New Delhi, India on 3-7 December 1979
Final rept.
Feb 81, 22p Rept no. CIR/BOSTID-81/INDIA
Contract AID/ta-C-1433

Keywords: *Food processing, *Food storage, Recommendations, Conservation, Grains(Food), Fruits, Vegetables, Food deterioration, Losses, India, Foreign technology.

This is the report on a workshop on postharvest food losses held in conjunction with the Indian National Science Academy in New Delhi, India, December 3-7, 1979. The workshop focused on postharvest conservation technologies in three food categories: food grains, roots and tubers, and fruits and vegetables.

PB81-160004 PC **A04/MF A01**
Colorado State Dept. of Highways, Denver. Div. of Transportation Planning.
Solar Powered Highway Sign
Final rept.
Robert L. Hayden, and Werner Hutter. Sep 80, 59p
CDOH-DTP-R-80-9, FHWA-CO-RD-80-9
Prepared in cooperation with Federal Highway Administration, Washington, DC.

Keywords: Solar power generation, Photovoltaic cells, *Solar energy, *Roads, Highway signs.

A roadside sign was equipped with lights powered by photovoltaic solar panels to improve nighttime visibility and evaluate equipment performance and needs. The photovoltaic panels were found to be reliable and effective for powering flashing lights on a highway warning sign. Cost of the panels is high so their use should be limited to locations where commercial electrical power is not available. Solar electric systems should be carefully designed to minimize costs and produce a reliable system. Sufficient protection for the solar panels should be provided in areas where theft or vandalism might be a problem.

PB81-160194 PC **A02/MF A01**
Transport and Road Research Lab., Crowthorne (England).
An Alternative to Bridge Painting
R. R. Bishop, and M. A. Winnett. c1980, 19p Rept no. TRRL-SUPPLEMENTARY-621
Also pub. as ISSN-0305-1315.

Keywords: Highway bridges, Protective coatings, Girder bridges, Humidity, Corrosion resistance, Maintenance, *Bridges, *Corrosion, Foreign technology.

A novel approach to the protection of the structural steelwork of composite bridges is proposed by physically changing the environment to which the steelwork is exposed. Clean steel does not corrode at relative humidities up to 99 percent if environmental contaminants are absent. It is apparent that the most critical factor affecting corrosion rates in enclosed spaces is pollution by chlorides and sulphur dioxide and not high relative humidity. A small scale experiment has shown that it is possible simply to enclose the already sheltered steelwork of a composite bridge to produce an environment which is contaminant-free and in which corrosion does not take place. It is very reasonable to assume that blast-cleaned painted steel will have a very long maintenance free life in such environments free from contaminants. There is also interesting preliminary experimental work which indicates that the corrosion rate of pre-corroded specimens reduces rapidly when introduced into a contaminant-free enclosure. This concept of steelwork enclosure is novel but if the observations and experiments carried out to date are proved correct then potential savings in maintenance painting could be considerable. (Copyright (c) Crown Copyright 1980.)

PB81-160202 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
Tensile and Compressive Strength of Some Stabilised Road Bases in Kenya
C. R. Jones, and H. R. Smith. c1980, 31p Rept no. TRRL-SUPPLEMENTARY-623
Also pub. as ISSN-0305-1315.

Keywords: *Roads, *Pavements, Africa, Tensile strength, Compressive strength, Moisture content, Sampling, Foreign technology, *Kenya.

This report describes the measurement of the direct tensile and unconfined compressive strength of samples cut from stabilized roadbases in Kenya. The test methods used are described, and the strength of the samples is compared with the performance of the roads. The report concludes that although the bases have lost tensile strength in service, they have not suffered serious structural damage and with routine maintenance these pavements should continue to perform satisfactorily. (Copyright (c) Crown Copyright 1980.)

PB81-160301 PC **A03/MF A01**
Alternate Energy Associates, Inc., Pittsburgh, PA.
Small Waste to Ethanol Plants, Phase II
George F. Huff, and M. Clark Fogle. Nov 80, 33p
NAFC-80-16

Keywords: *Ethanol, *Cellulose, Hydrolysis, Economic analysis, Acid treatment, Enzymes, Fuels, Design criteria, Performance evaluation, Feasibility, Fermentation, *Automotive fuels, Solid wastes, Alcohol fuels.

The economics of the conversion of waste cellulose to ethanol through acid hydrolysis are estimated at three levels of production: 1 million, 5 million, and 10 million gallons per year of motor fuel grade alcohol. Assumptions and estimating techniques are the same as used in Phase I of the study: the feedstock is the combustible portion of MSW; a waste separation plant is assumed to be nearby; the alcohol plant is assumed to be located inside the fence of an existing operating facility with steam and other utilities available for purchase. The results indicate that, as with the case of enzyme hydrolysis, none of these levels will produce alcohol competitively. It is found, however, that the acid process seems to have a slight edge.

PB81-160673
(Order as PB81-160616, PC **A04/MF A01**)
Shandong Inst. of Parasitic Diseases, Jining (China).
Studies on Control of Malayan Filariasis in China
Zhong Chonghu, and Zheng Huijun. Aug 80, 8p
Included in Chinese Medical Jnl., v93 n8 p537-544 1980.

Keywords: Filariasis, Infectious diseases, *China, Public health, Parasitic diseases, Reprints, *Health, Foreign technology, *Diseases.

Large scale control of malayan filariasis has been achieved in China by carrying out mass surveys and total population treatment mainly with diethylcarbamazine (DEC) or DEC medicated salt reducing the microfilaria rate to minimum levels. But surveillance and cam-

paigns must be continued for at least 10 years. The authors have little experience in exterminating the Anopheles sinensis vector. The density of this species of vector is still fairly high here so further investigation and studies should be made in order to find a method of controlling it. This is the major task today.

PB81-160855 PC A03/MF A01
Agency for International Development, Washington, DC.
Appropriate Technology and Scaling Considerations for Developing Nations
Harold A. Le Sieur. Jul 80, 47p
Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador). Paper presented at the International Symposium of Engineering (3rd) Held at UCA on July 25-30, 1980.

Keywords: *Technology assessment, Developing countries, Agricultural chemistry, Agricultural products, Chemical engineering, Raw materials, Fertilizers, Limestones, *Appropriate technology, Developing country application, Waste recyling.

The paper emphasizes the role of the chemical engineer as 'promoter' on the basis that most chemical engineers have been raised on the proposition that large scale and high technology are essential for process viability. But some of them do not take into consideration that economy of scale is not always appropriate, feasible or even possible in developing countries. It concludes that appropriate technology may call for high technology in certain cases, but more often intermediate or low technology better fits with available resources. To illustrate, four examples are cited, all based on salvaging waste or underutilized raw materials for the manufacturing of food products or fertilizers. It considers (1) banana waste, (2) the discharged sludge from palm oil processing (agricultural residues), (3) pyrolytic conversion of rice hulls, logging, coconut, oil palm wastes, rubber and bagasse, (4) mini fertilizer generator for farm use (for the manufacture of modest amounts of fertilizer based on small, low quality phosphate and limestone deposits using alternate energy sources).

PB81-160962 PC A03/MF A01
Universidad Central de Venezuela, Caracas.
La Problematica Tecnologica Latinoamericana y Sus Implicaciones en el Desarrollo de una Ingenieria Nacional (Latin America Technological Problem and Its Implications in the Development of National Engineering)
Getulio Tirado, Edgar Paredes, Miguel Genova, Luis Alvaray, and Jorge Giordani. Feb 79, 49p
Text in Spanish.

Keywords: *Latin America, *Technology transfer, Engineering, Industrial engineering, Technological intelligence, Technology innovation, Production engineering, Developing country application, Research and development, Industrial technology.

The report introduces four perspectives to follow up: (1) Strategical elements that hasten the technological development within the Latin American countries; (2) Technological Policy within Latin America; (3) Characterization of the development of the Latin American Engineering; and the (4) Lineaments for the development of a National Engineering. In conclusion, it reflects the idea that all Latin American countries should create different organic links between science and production, setting out from their historical background and working toward an appropriate technological transfer.

PB81-161127 PC A03/MF A01
Ohio Univ., Athens.
Remanufacturability and Repairability of Durable Products as Technology More Appropriate for Both Developed and Developing Countries
Charles M. Overby. Feb 79, 45p
Paper presented at the International Symposium of Engineering (2nd) Held at UCA on 19-23 Feb 79. Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

Keywords: *Technology assessment, Developing countries, *Maintenance, Manufacturing, Product development, Design criteria, Labor estimates, Conservation, Waste disposal, Meetings, Recyling.

It is the thesis of this paper that in some ways, technology appropriate to less developed countries (LDC's) could come from technology of the developed countries (DC's) that is more appropriate for DC's in a future world of resource constraints (materials and energy) and environmental constraints. More specifically, this paper explores the idea of durable products which have been designed with remanufacturability and repairability as more important design criteria than presently appears to exist. The majority of this paper is an overview of contemporary remanufacturing activity, issues, and questions in the U.S.A. from both the private sector and governmental perspective.

PB81-161200 PC A05/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part A: Effects of Trail Bridges. Volume 1: Introduction, Summary and Recommendations
Final rept.
Jun 78, 99p AID-PN-AAG-446
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, *Bridges, Developing country application.

This volume presents an overview of an extensive study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study report as a whole is divided into three parts with seven total volumes, of which this is the first. The four remaining volumes in Part A contain case histories of thirteen trail bridges constructed under former USAID projects between 1956 and 1975; the volume comprising Part B discusses the study of traditional suspended bridges built with local initiative and technology in the District of Baglung; and the one volume of Part C presents an annotated bibliography and general information on trail bridges and trails in Nepal. The present volume first sets out the study's objectives and methodology, the latter relying heavily on opinion polls of local panchayat people and government officials, school teachers, porters, traders, and common rural folk. A general discussion of trail bridge construction in Nepal and of the socioeconomic background of the rural hills people precedes the report summary and recommendations.

PB81-161218 PC A09/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part A: Effects of Trail Bridges. Volume 2: Case History, Analysis and Findings on Bridges Studied in Central Development Region
Final rept.
Jun 78, 192p AID-PN-AAG-447
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, *Bridges, Developing country application.

This is the second volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These efforts have not proven entirely successful and, on occasion, have even resulted in the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains case studies of former USAID trail bridge projects in the Central Development Region of Nepal, including the Karambot, Syabrubesi, Kagune, and Pachuwarghat bridges. The volume is divided into four sections, one for each case study. Each contains an area description and history (including the bridge location history and selection process); analysis and findings of the socio-anthropological, institutional, and economic impact studies, as well as those of the engineering investigations; and illustrative photographs.

PB81-161226 PC A08/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part A: Effects of Trail Bridges. Volume 3: Case History, Analysis and Findings on Bridges Studied in Western Development Region
Final rept.
Jun 78, 153p AID-PN-AAG-448
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, *Bridges, Developing country application.

This is the third volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These efforts have not proven entirely successful and, on occasion have even resulted in the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains case studies of former USAID trail bridge projects in the Western Development Region of Nepal, including the Darondi, Manbagh, and Jhaprebagar bridges. The volume is divided into three sections, one for each case study. Each contains an area description and history (including the bridge location history and selection process); analysis and findings of the socio-anthropological, institutional, and economic impact studies as well as those of the engineering investigations; and illustrative photographs.

PB81-161234 PC A08/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part A: Effects of Trail Bridges. Volume 4: Case History, Analysis and Findings on Bridges Studied in Far Western Development Region
Final rept.
Jun 78, 161p AID-PN-AAG-449
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, *Bridges, Developing country application.

This is the fourth volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These efforts have not proven entirely successful and, on occasion, have even resulted in the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains case studies of former USAID trail bridge projects in the Far Western Development Region of Nepal, including the Bhingri, Sanfebagar, and Malumela bridges. The volume is divided into three sections, one for each case study. Each contains an area description and history (including the bridge location history and selection process); analysis and findings of the socio-anthropological, institutional, and economic impact studies, as well as those of the engineering investigations; and illustrative photographs.

PB81-161242 PC A07/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part A: Effects of Trail Bridges. Volume 5: Case History, Analysis and Findings on Bridges Studied in Eastern Development Region
Final rept.
Jun 78, 142p AID-PN-AGG-450
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, *Bridges, Construction, Economic analysis, Rural sociology, Social change, Transportation, Developing country application.

This is the fifth volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The

study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These efforts have not proven entirely successful and, on occasion, have even resulted in the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains case studies of former USAID trail bridge projects in the Eastern Development Region of Nepal, including the Toxelghat and Turkeghat bridges and the Leguwaghat cableway. The volume is divided into three sections, one for each case study. Each contains an area description and history (including the bridge/cableway location history and selection process); analysis and findings of the socio-anthropological, institutional, and economic impact studies, as well as those of the engineering investigations; and illustrative photographs.

PB81-161259 PC A05/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part B: Baglung District Bridge Construction Study
Final rept.
Jun 78, 78p AID-PN-AAG-451
Also available in set of 7 reports PC E99, PB81-161192.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, *Bridges, Developing country application.

This is the sixth volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These have not been entirely successful and, on occasion, have even resulted in the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains an examination of traditional suspended bridges built with local initiative and technology in the District of Baglung. Forty such bridges were completed and commissioned for use during the period 1975-1978. At the time of the study, this was the only instance of such a large-scale, organized bridge-building effort undertaken with local initiative and government participation in Nepal, and as such had created widespread interest throughout the country and in foreign agencies like USAID, the United Nations Development Program, the German Embassy, and others. This Baglung District study utilized the case study approach and was based primarily on a review of relevant Nepalese government documents, inspections of bridge locations, and interviews with government officials, panchayat workers, school teachers and local people. The study report is divided into sections containing an introduction and purpose statement, methodology, case history in brief, the socioeconomic background of the district, technology and project background, analysis, and a summary and recommendations. The major conclusion is that this type of local initiative and participation should be encouraged and supported by the Government, which should immediately initiate this type of program on an experimental basis in other neighboring districts.

PB81-161267 PC A04/MF A01
East Consulting Engineers, Kathmandu (Nepal).
Trail Suspension Bridge Study. Part C: Annotated Bibliography and General Informations on Trail Bridges and Trails in Nepal
Final rept.
Jun 78, 51p AID-PN-AAG-452
Also available in set of 7 reports PC E99, PB81-161267.

Keywords: Foot bridges, *Nepal, Developing countries, Construction, Economic analysis, Rural sociology, Social change, Transportation, Bibliographies, *Bridges, Developing country application.

This is the seventh and final volume of an extensive final report describing a study to develop a set of criteria for the selection of trail suspension bridge sites in Nepal. The study as a whole was a reaction to the confusion, lack of integration with other development projects, and lack of thought to the social and political aspects of development which have characterized earlier USAID suspension bridge projects in Nepal. These efforts have not been entirely successful and, on occasion, have even led to the misplacement of bridges, with the inevitable consequences of minimal benefits. This volume contains a 59-item annotated bibliography (1960s and 1970s) on trail bridges and trails in Nepal, consisting mainly of guidebooks/atlases, bridge project feasibility studies and progress reports, socioeconomic studies, civil engineering studies and manuals, and government development plans. General information concerning related Nepalese and foreign institutions; engineers, technicians and other persons who have knowledge of the trail bridge construction projects; steel fabricators; and trekking agencies in Kathmandu is also included. A list of abbreviations used in preparing the report is appended.

PB81-162000 PC A02/MF A01
Georgia Univ., Athens.
A Survey of Agro-Mechanical Technology Applications on Small Farms in Selected Latin American Countries
J. M. Patrick, and R. L. Clark. Feb 79, 24p
Paper presented at the International Symposium of Engineering (2nd) Held at UCA on 19-23 Feb 79. Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

Keywords: Farms, Agricultural engineering, Technology transfer, *Latin America, Central America, Chemical engineering, Return on investment, Employment, Colombia, Costa Rica, Guatemala, Honduras, Cultivation, Irrigation, Production, Harvesting, Agronomy, Meetings, *Agricultural machinery.

The study sought to evaluate the actual and potential role of chemical technologies to increase food production, create more employment opportunities, and increase income for the small farmer in Colombia, Costa Rica, Guatemala and Honduras. The paper includes a limited description of the existing on-farm technologies presently used for crop production, with an emphasis on power sources, tillage, irrigation and harvesting. It is pointed out that tillage operations require the highest energy input of all crop production processes for annual crops; therefore, tillage should be given prime consideration for initial mechanization. The paper provides an interpretative discussion of the actual and potential role of appropriate technologies for the small farmer in the region examined.

PB81-162019 PC A02/MF A01
Structural Engineering Research Centre, Roorkee (India)
Development of Small Capacity Ferrocement Bins and Water Tanks
S. Gopalakrishnan, and P. O. Sharma. Feb 79, 24p
Paper presented at the International Symposium of Engineering (2nd) Held at UCA on 19-23 Feb 79. Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

Keywords: Storage tanks, *Cement, Fabrication, Prefabrication, Casting, Cost analysis, *Food storage, *Water supply, Foreign technology, Developing country application, *Ferrocement.

In this paper the work carried out at the Structural Engineering Research Centre, Roorkee (India) on the development of prefabricated small capacity ferrocement bins and water tanks has been presented. Details of ferrocement bins and water tanks, casting process developed, assembly of bin and water tank, cost estimates have been outlined.

PB81-162026 PC A02/MF A01
Massachusetts Univ., Amherst.
Bamboo Pipes for Pressurized Water Systems: The Potential for Home and Agricultural Use
Stanley Lippert. Feb 79, 24p
Paper presented at the International Symposium of Engineering (2nd) Held at UCA on 19-23 Feb 79. Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

Keywords: Water pipes, *Bamboo, Pressurizing, *Water supply, Assembling, *Pipes(Tubes), Foreign technology, Developing country application.

This is a study to determine the feasibility of using bamboo pipes for pressurized water systems in or at home. Procedures were developed for the testing of samples cut from bamboo culms approximately one meter in length. A field test was conducted in Costa Rica. The test consisted in cutting the bamboo, pressure-testing samples of the cuttings, and developing simple methods of sizing pipe by standardizing end diameters and letting length vary. The feasibility of using bamboo pipes for pressurized water systems was demonstrated with regard to pressure properties and assembly procedures.

PB81-162034 PC A02/MF A01
Loughborough Univ. of Technology (England).
The Role of Professional Training in Technology Development
D. J. Billau, and R. J. Sury. Jul 80, 21p
Paper presented at the International Symposium of Engineering (3rd) Held at UCA on 25-30 Jul 80. Sponsored in part by Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).

Keywords: Industrial training, Technology innovation, Professional personnel, Design, Engineering, Manufacturing, Production engineering, Developing countries, Meetings, *Training, *Industrial development.

Manufacturing development does not occur as a natural phenomenon; it requires engineers with vision and creative ability to initiate the process and create the achievement. Technological change introduces the need for a knowledge of a widening range of manufacturing methods, techniques and processes if the most appropriate solutions to the associated manufacturing problems or requirements are to be achieved; the requirements for professional training are widening accordingly. The document illustrates the way in which emphasis can be placed on Design and Manufacture to fulfill particular industrial needs.

PB81-163248 PC A12/MF A01
International Center for Living Aquatic Resources Management, Manila (Philippines).
Integrated Agriculture-Aquaculture Farming Systems
Conference proceedings
Roger S. V. Pullin, and Ziad H. Shehadeh. 1980, 254p Rept no. ICLARM/CP-4
Proceedings of the ICLARM-SEARCA Conference on Integrated Agriculture-Aquaculture Farming Systems Held at Manila, Philippines on 6-9 Aug 79.

Keywords: *Agriculture, *Aquaculture, Meetings, Rice plants, Fishes, *Poultry, Agricultural wastes, Swine, Ponds, Waste treatment, *Agricultural economics, *Southeast Asia.

Integrated livestock-fish, fowl-fish and rice-fish farming and crop rotation in fishponds have been practiced for centuries in Asia. The integration of aquaculture with livestock and crop farming offers greater efficiency in resource utilization, reduces risk by diversifying crops and provides additional food and income. The immediate objective of the conference was: to provide an overview of integrated agriculture-aquaculture farming systems as currently practiced in a number of Southeast Asian countries; to review available experience and technology; to discuss the social and economic aspects of these systems and identify research and development requirements.

PB81-164444 PC A07/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Energy Perspectives for Underdeveloped Countries. Part I
Feb 79, 131p

Keywords: Energy, Meetings, Solar energy, Developing countries, Foreign technology, *Solar heating systems, Flat plate collectors, *Solar water pumps, *Solar drying, Total energy systems, Renewable energy sources.

These papers were presented in some of the work sessions at the Second International Symposium of Engineering, held at Universidad Centroamericana, Jose Simeon Canas, February 1979. The document covers various aspects of solar energy development. Titles of works presented are: Renewable energy technologies for arid lands development, Development of small total-energy systems, Engineering obstacles to the utilization of non-conventional sources of energy, Solar energy: present activities and future potential, Development of a novel solar heating and cooling

device, A flat collector water pumping solar system, Solar powered water pump for the rural third world, A low cost solar collector suitable for use in peanut drying application.

PB81-105763 PC A07/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Energy Perspectives for Underdeveloped Countries. Part II
Feb 79, 146p
Papers presented at the International Symposium of Engineering (2nd) Held at Universidad Centroamericana Jose Simeon Canas on February 19-23, 1979.

Keywords: Developing countries, Geothermal prospecting, Petroleum geology, Biomass, Electric power distribution, Exploration, *Geothermal energy, *Oil, Energy source development, *Bioconversion, *Solar collectors.

The document covers different aspects of solar energy, including prospecting methods in the search of petroleum, and new technologies in exploration for geothermal systems. Titles of works are: A mathematical model for a solar rock collector, Electrical prospecting methods in the search for petroleum, New technology in exploration for geothermal systems, Conversion of organic wastes and biomass to substitute natural gas, Liquid fuels from cellulosic biomass: an elevated temperature process using thermoactinomyces cellulase, Electric distribution systems for rural areas.

PB81-170177 PC A13/MF A01
AIA Research Corp., Washington, DC.
Regional Guidelines for Building Passive Energy Conserving Homes
Jul 80, 300p* HUD/PDR-355(2)
Contract HUD-H-2384
Sponsored in part by Department of Energy, Washington, DC.

Keywords: Residential buildings, Handbooks, Climate, Structural design, Regional planning, Guidelines, Architecture, United States, *Solar heating systems, *Solar cooling systems, *Buildings, Passive solar heating systems, *Energy conservation, Passive solar cooling systems.

This handbook presents and illustrated guidelines for building passive energy-conserving homes in 13 regions of the United States, ranging in climate from the biting cold temperatures of New England to the rainy damp climate of the Gulf Coast area. An introductory chapter defines the concepts of basic climate condition, climatic liabilities and climatic assets. For each residential climate, a chapter presents guidelines in two sections. The first section provides a brief climate description, includes a map showing the general region, lists the climates liabilities and assets, and provides a more detailed description of regional climatic design conditions. The second section lays out a series of general building prinicples to aid in energy conservatation and includes illustrated ideas on how to apply these principles. Two additional sections of the book discuss methods for heating without mechanical heating and methods for cooling without mechanical cooling. Case studies and photographs are presented of architectural designs using both passive heating systems, such as solar heating, and passive cooling systems, such as natural and induced ventilation systems.

PB81-172637 PC A07/MF A01
Jordan (Edward C.) Co., Inc., Portland, ME.
Removal of Phenolic Compounds from Wood Preserving Wastewaters
Final rept. 20 Nov 78-20 May 80
Bruce K. Wallin, Arthur J. Condren, and Roy L. Walden. Mar 81, 150p EPA-600/2-81-043
Contract EPA-68-03-2605

Keywords: *Wood preservatives, Industrial waste treatment, *Water pollution, *Phenols, Chlorine aromatic compounds, Adsorption, Solvent extraction, Reviews, Ion exchange resins, Oxidation, Wood processing, Phenol/pentachloro, State of the art.

Laboratory and pilot-scale studies were undertaken to develop economically feasible technologies for the treatment of wastewaters from wood preserving operations. Of prime concern was the removal of phenol and its chlorinated derivatives, in particular, pentachlorophenol. Screening analysis of the wastewater indicated that pentachlorophenol was the only chlorinated derivative consistently present in concentrations of approximately 100 mg/l. Treatment technologies investigated for the treatment of these wastewaters included: (1) adsorption; (2) biological oxidation; (3) chemical oxidation; (4) coagulation; (5) extraction; and (6) pH adjustment. Each of the above, along or in combination, was capable of yielding a measurable reduction in the concentration of total phenols and pentachlorophenol in the untreated wastewater. Two technologies yielded consistently high levels of treatment: pH adjustment of the wastewater, followed by adsorption with bentonite clay and final polishing by the polymeric adsorbant, XAD-4; and pH adjustment of the wastewater, followed by extraction with a mixture of No. 2 fuel oil and a cosolvent such as still bottoms from amyl alcohol production.

PB81-176174 PC A06/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
New Methods Pay with Poultry (Revised Edition)
Program and training journal reprint series
Allan A. McArdle, and J. N. Panda. 1964, 113p Rept no. REPRINT SER-30

Keywords: Production, Chickens, Feeding stuffs, Eggs, Shelters, Nutrition, Agricultural wastes, Cost analysis, Diets, *Poultry.

The purpose of this booklet is primarily to help officers working with poultry. It presents information on the new methods of poultry management which were first demonstrated in Orissa India during 1960-61. It gives an indication of the results, which can be obtained with poultry handled with these methods, and profit margin possible.

PB81-176737 PC A04/MF A01
Northern Energy Corp., Boston, MA.
Using Crop Residues to Produce Alcohol
William Lockeretz. May 80, 73p NAFC-80-18

Keywords: *Alcohols, Ethyl alcohol, *Agricultural wastes, Resources, *Fuels, Plant residues(Organic), Soil erosion, Cost analysis, Plant nutrition, Refuse derived fuels.

Crop residues are receiving considerablo attention as a source of fermentable sugars for alcohol production. Most of the cost of producing residues is associated with the primary crop, i.e., the grain. Using 'cost' in a very narrow sense, the only cost of producing residues is that of the additional harvesting, transportation, and storage operations to bring the residues from the field to the point of use. Moreover, residues can also be used as a boiler fuel. Residues are also valuable in ways not reflected in any market. The most important of these is their critical role in reducing soil erosion from cropland. The relative costs and benefits of using grains and crop residue for alcohol production is a complex question. This report examines three important aspects of the relative benefits and problems of using crop residues to produce alcohol. The first is the gross production of residues in a purely physical sense, and the economic costs of using them. The second main topic concerns the value of crop residues in maintaining soil quality. Finally the policy issues relating to residue use for alcohol, especially the need to insure that such use occurs only when it does not lead to long-term degradation of the nation's cropland are discussed.

PB81-176745 PC A05/MF A01
Northern Energy Corp., Boston, MA.
Grain Production for Alcohol Fuels
William Lockeretz. May 80, 87p NAFC-80-19

Keywords: *Fuels, Grains crops, *Agricultural economics, Production, Ethanols, Corn, Wheat, Grain sorghum, *Grains(Food), Income, Food, Prices, Exports, Supply(Economics), Trends, Policies, *Alcohols.

This report provides primarily an assessment of the resource base for producing alcohol fuel from grain. The effect of different levels of alcohol production are discussed with respect to farm income, land conservation practices, food prices, and exports. The economics of ethanol production from the standpoint of feedstock availability and price are comprehensively examined.

PB81-177362 PC A03/MF A01
Wisconsin Univ.-Madison. Land Tenure Center.
Land Tenure and Agricultural Development
Ralph W. Cummings, Jr. Jul 78, 39p Rept no. LTC-117
Also pub. as ISSN-0084-0793.

Keywords: Developing countries, Land titles, *Agriculture, Farm management, Land development, Government policies, Production, *Land use, Agricultural economics, Ownership.

The report reviews the major issues on the subject of land tenure and agricultural development in developing countries. It considers alternative strategies that government can use in attempting to create a land tenure structure which is supportive of its development objectives.

PB81-179095 PC A11/MF A01
Rehab Group, Inc., Falls Church, VA.
Feasibility Study of an Integrated Pest Management Information Dissemination System
James W. White. 25 Jul 80, 228p*
Sponsored in part by Council on Environmental Quality, Washington, DC.

Keywords: Information systems, *Pest control, Information centers, Pesticides, Data retrieval, Specialized training, User needs.

Integrated pest management is an approach to pest control which maximizes the effectiveness of natural controls of pest population and reduces the need for application of chemical pesticides. The concept of integrated pest management has been demonstrated to be economically feasible, efficacious, and environmentally effective with specific crops. This study seeks to establish the requirements for, and the feasibility of, an effective system for IPM information dissemination.

PB81-181463 PC A06/MF A01
Cornell Univ., Ithaca, NY.
Technology Choice in Developing Countries
Final rept. on Phase 1
Erik Thorbeck, Jan Svejnar, William Whyte, and Walter Lynn. Jan 80, 115p
Grant NSF-PRA78-24018

Keywords: *Technology assessment, Developing countries, *Agricultural economics, Agricultural engineering, Economic development, Technological intelligence, Research projects, Technology transfer, Farm management, *Research and development, Industrial technology, Industrial development.

Factors are examined which influence the choice of technology and its effects at various stages of economic development. The prime purpose is to formulate conceptual frameworks for analyzing technology choices (TC). The report presents two conceptual models for carrying out this function and discusses the following areas of concern: ongoing research on agricultural research and development (R & D) with respect to small (poor) farmers; effects that different forms of farm/firm organizations and market structure could have on TC; and efforts to analyze existing economic and engineering approaches and to examine the possibilities for a fruitful interdisciplinary synthesis. Institutional research carried out in countries visited during the first phase of the study is reported with special attention devoted to preliminary assessment of contributions of S & T institutions to TC and industrial development. Major findings and plans for future research are summarized.

PB81-181604 PC A05/MF A01
Community Services Administration, Washington, DC.
Evaluation of Puerto Rico Community Services Administration
5 Sep 80, 93p Rept no. CSA-LN-2638

Keywords: *Community development, *Puerto Rico, Services, Evaluation, Low income groups, Local government, Economic conditions, Poverty, Antipoverty programs.

The report presents the results of an evaluation of the Puerto Rico Community Services Administration (PRCSA). The purpose of the evaluation was to (1) identify and measure the primary causes and conditions of poverty in Puerto Rico, (2) the impact of

PRCSA in eradicating or ameliorating the conditions of poverty and (3) PRCSA's success in meeting the Standards of Effectiveness.

PB81-182412 PC A03/MF A01
Economics and Statistics Service, Washington, DC. Economic Development Div.
Energy and Labor Use by Rural Manufacturing Industries
Rural development research rept.
Edward J. Smith. Feb 81. 27p Rept no. RDRR-26

Keywords: Manpower, *Employment, Rural areas, Manufacturing, Industrial plants, *Industrial development, *Energy, Shortages, Industries, Requirements, Labor estimates, Energy consumption, Energy use.

Energy use was weighed against labor use in 450 manufacturing industries to help judge the effect on jobs of rationing energy during a shortage. In 1975, over one-half of manufacturing energy was used by 32 industries employing less than 5 percent of manufacturing labor. Nonmetro areas, where manufacturing is the largest employer, had over one-third of U.S. employment in industries with a high energy-to-labor ratio, larger than their one-fourth share of all manufacturing employment. Regionally, the South Central and Rocky Mountain States accounted for about one-third of high energy-to-labor employment, but only one-sixth of all manufacturing employment.

PB81-184160 PC A99/MF A01
Universidad Centroamericana Jose Simeon Canas, San Salvador (El Salvador).
Tecnologia Apropiada para Paises Subdesarollados. (Appropriate technology for Underdeveloped Countries) (2nd Symposium)
c1979, 681p
Text om Spanish.

Keywords: *Technology assessment, Developing countries, Meetings, Technology transfer, Economic conditions, Sociology, Urbanization, Ecology, Education, Political systems, Engineering, *Appropriate technology, Developing country application.

This is the first volume of lectures presented by several scientists from 16 countries of the world discussing their experiences with the problem of acquiring Appropriate Technology in developing countries. The papers are in English and Spanish, in almost an equal number. The objectives are: (1) study the technical aspects related to technology utilization in developing countries; (2) promote the use of those technologies, appropriate to the socio-economic conditions in those countries; (3) look for solutions to technical, ecological and social problems that arise from the application of technologies appropriate to developed countries without critical judgement to developing areas and others. Various topics are included: economy, sociology, urbanism, ecology, education, politics, etc. related to the present knowledge on different aspects of engineering.

PB81-184582 PC A21/MF A01
Washington Center for Metropolitan Studies, DC.
Capturing the Sun Through Bioconversion
W. Carey, L. B. Schlivek, and J. Quarles. c1976, 500p* NSF/RA-760273
Sponsored in part by Environmental Protection Agency, Washington, DC., Department of Commerce, Washington, DC., and Department of Agriculture, Washington, DC. Proceedings of a conference held at Washington, DC. on March 10-12, 1976.

Keywords: Biomass, Meetings, Plants(Botany), Fuels, Foods, Technology, Environmental impact, *Solar energy, Biological energy conversion, *Bioconversion, Chemical feedstocks.

This conference reviewed bioconversion techniques by which solar energy can be stored in plant forms, recovered from organic wastes, and transformed into fuels, foods, and chemicals to help meet mankind's increasing needs. Broad conference statements addressed the gas deficit, the ecology of bioconversion, bioconversion opportunities, and overview perspectives. Presentations on biomass sources covered urban, industrial, agricultural, and forestry wastes. Papers on bioconversion processes/products described gaseous, liquid and solid fuels, related products, and long-range concepts. Overall impacts were discussed with respect to technology assessment, environmental economic/social impacts, and international aspects. The conference indicated the following major needs: (1) stepped-up pilot projects with emphasis on waste disposal, alcohol fuels, small-scale digesters, and special energy farming; (2) net impact assessment focusing on economic/social and environmental impacts, and (3) international cooperation stressing carefully-related conferences, project-result circulation, and international network of clearinghouses. (Copyright (c) Council on Solar Biofuels, 1976.)

PB81-190100 PC A11/MF A01
Department of Agriculture, Washington, DC.
Small-Scale Fuel Alcohol Production
Technical rept.
Mar 80, 237p
Prepared in cooperation with Development Planning and Research Associates, Inc., Manhattan, KS.

Keywords: *Ethanol, Biomass, Starches, Sugars, Cost analysis, By products, Fuels, Farms, Design criteria, *Alcohols, *Automotive fuels, Fermentation, Utilization, Feeding stuffs, Solid wastes, Chemical feedstock.

This report describes in substantial detail technical and economic aspects of small-scale ethanol production from on-farm units producing up to 360,000 gallons per year and community plants producing up to 2 million gallons per year. The description of feedstock materials is limited to those containing starches and sugars, not cellulosic materials. Factors influencing the introduction of small-scale ethanol production are evaluated, including the availability and technical capabilities of production equipment. Also discussed are the types and sizes of farms and community operations for which ethanol production is appropriate. The report describes the characteristics of ethanol and its use as a motor fuel, the production and use of co-products, and problems typically encountered by small-scale producers. Information on investment, operation, maintenance and feedstock costs is estimated and analyzed. A sensitivity analysis describes changes in the cost of ethanol production resulting from changes in the major cost elements.

PB81-191777 PC A14/MF A01
ACTION/Peace Corps, Washington, DC. Information Collection and Exchange.
Guia de Cosechas para Los Tropicos y SubTropicos (Guide for Field Crops in the Tropics and Subtropics)
Samuel C. Litzenberger. Sep 76, 325p
Text in Spanish.

Keywords: Agronomy, Farm crops, *Tropical regions, *Leguminous plants, *Grains(Food), *Oilseed crops, Vegetables, *Cotton plants, Developing country application.

The report describes crop production and farming systems in the tropical environment. It discusses general farm crops, grain plants, oil seed plants, fiber crops and leguminous plants.

PB81-195273 PC A13/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Technology Assessment of Guayule Rubber Commercialization
Final rept.
Kenneth E. Foster, William G. McGinnies, Jonathan G. Taylor, Jean L. Mills, and Ralph R. Wilkinson. May 80, 299p NSF/PRA-7811632
Grant NSF-PRA78-11632
Prepared in cooperation with Midwest Research Inst., Kansas City, MO.

Keywords: Elastomers, Natural rubber, Technology assessment, Economic factors, Land use, Yield, Prices, Plant reproduction, Seeds, Soil properties, Salinity, Soil water, Demand(Economics), Shrubs, Deserts, United States, *Rubber, *Guayule, Parthenium argentatum.

A technology assessment has been conducted of the potential commercialization of the desert shrub guayule (Parthenium argentatum) as a domestic source of natural rubber for the United States. This report presents synopses of elastomer supply and demand projections during the next 20 years, the state of development of guayule technology, and the driving forces and constraints of guayule commercialization. Also included are the first publication of the development scenarios, projected consequences of guayule development, and public policy-issue-analyses. The study focuses on policy implications of alternative means of guayule commercialization.

PB81-195307 PC A11/MF A01
Macmillan Co. of India Ltd., Madras.
Proceedings of the International Symposium on Biological Applications of Solar Energy Held at Madurai Kamaraj University, India on December 1-5, 1978
A. Gnanam, S. Krishnaswamy, and Joseph S. Kahn. c1980, 231p
Prepared in cooperation Maduraj Kamaraj Univ. (India), and North Carolina State Univ. at Raleigh.

Keywords: Meetings, *Solar energy, Photosynthesis, Productivity, Nitrogen fixation, Biomass, Models, Risk, *Plants(Botany), Environments, Metabolism, *Bioconversion, Foreign technology.

This book contains the articles presented and discussed during the International Symposium on Biological Applications of Solar Energy held at Madurai Kamaraj University in December 1978. The focal theme of the symposium was to look into the solar option as an alternate source of energy to the traditional commercial forms through biological means. Solar energy harvesting through photosynthetic means for biomass and biofuel production constituted the major thrust of the deliberation. The articles are grouped into eight parts: global and regional aspects of solar energy; photosynthesis and productivity, experimental studies; photosynthesis and productivity, field studies; nitrogen fixation; biomass; extreme environment; model systems; and biofuels and chemicals.

PB81-195877 PC A03/MF A01
Intermediate Technology Development Group, London (England).
Fabricas de Cemento de Pequena Escala (Small-Scale Cement Plants)
John Sigurdson. 1977, 44p
Text in Spanish.

Keywords: *Industrial plants, *Cement, *India, *China, Portland cements, Shaft kilns, Production, Plant location, Developing country application.

The booklet examines the criteria which would justify the establishment of mini cement plants in developing countries and specifically compares the situation in India with that in China, where more than 57% of cement is produced by small plants. The quality of the cement produced is also discussed and comparisons are drawn between cement from mini cement plants and that of portland cement. A short bibliography is provided as well as designs of vertical shaft kilns taken from a Chinese book on small scale cement plants.

PB81-196750 PC A03/MF A01
Sea Run, Inc., Kennebunkport, ME.
A Solar Heated Fish Hatchery Water Recycling System
Technical completion rept.
Evelyn S. Sawyer, and Philip J. Sawyer. Jul 80, 42p
OWRT-C-80165-R(8811)(1)
Contract DI-14-34-0001-8811
Also pub. as OWRT/RU-81/3.

Keywords: *Waste water reuse, *Solar water heating, Aquaculture, *Fisheries, Filtration, Chemical removal(Sewage treatment), Water consumption, Pumps, Temperature, Tanks(Containers), Growth, Survival, Cost analysis, Trout.

The purpose of this project was to rear smolts, young salmonids large enough for seawater entry, in a water recycling hatchery. High house was necessary to overcome temperature and groundwater limitations in coastal Maine and New Hampshire. Four rearing units were operated in a partially underground building. Each unit consisted of a 2,000 gallon fish tank and 500 gallon flooded biological filter, and reared 20,000 to 25,000 rainbow trout to smolt size (4 inches). Water consumption averaged 10 gallon/day/unit compared to 57,000 gallon/day/unit in a flow-through hatchery. Solar heating of water to accelerate fish growth resulted in shortening production time for a 4 inch fish from 18 months to 6 months. Costs/unit were approximately the same as those of a flow-through hatchery.

PB81-197014 PC A04/MF A01
Design Alternatives, Inc., Washington, DC.
Planning Local Solar Projects
1981, 66p*
Contract CSA-D9AF-009

Keywords: Solar heating, *Solar energy, Local government, Communities, Low income groups, Residential buildings, Planning, Guidelines, Recommendations, *Community development, Solar space heating, Solar water heating.

The purpose of this guidebook is simply to serve as a guide in the development, implementation, and evaluation of a local solar project.

PB81-197428 PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Integrated Pest Management
Research summary.
Sep 80, 33p Rept no. EPA-600/8-80-044

Keywords: *Pest control, *Pesticides, Insecticides, Insects, Management, Farm crops, Forests, Biological pest control, Federal government.

This Research Summary describes an alternative approach towards pest management--an approach that takes into account both the necessity and the danger of pesticides. Integrated pest management involves the carefully managed use of multiple pest control tactics. It is a highly effective alternative that minimizes the use of chemical controls and maximizes the use of natural processes, thereby avoiding many of the problems associated with pesticides use.

PB81-197584 PC A11/MF A01
Iowa State Univ., Ames.
Safe Disposal Methods for Agricultural Pesticide Wastes
Final rept.
Charles V. Hall, James Baker, Paul Dahm, Loras Freiburger, and Greg Gorder. May 81, 240p* EPA-600/2-81-074
Grant EPA-R-804533

Keywords: *Pesticides, *Waste disposal, Sampling, *Agricultural wastes, Linings, Entomology, Bacteriology, Evaporation, Safety, Degradation, Water pollution, Path of pollutants.

A systematic evaluation of disposal systems for diluted waste pesticides was conducted at two Iowa State University experimental farms. One system, located at the Horticultural Research Station, consisted of a 30,000-liter concrete-lined pit filled with a layer of soil between two layers of gravel and equipped with a rain-activated cover. The second system, located at the Agronomy-Agricultural Engineering Center, involved two polyethylene-lined pits. In addition to investigation of these macropit disposal systems, a study was made of 56 covered, vented minipits where additions of pesticides were controlled. Evaluation of the pit disposal systems included detailed chemical sampling of the systems and their surrounding environments, identification and counts of bacterial populations, entomological studies, estimation of pesticide volatilization rates, and evaluation of pit design for efficiency, effectiveness, and convenience of operation.

PB81-198079 PC A09/MF A01
International Potato Center, Lima (Peru).
Developments in the Control of Potato Viruses: Report of the Planning Conference Held at Lima, Peru on November 14-18, 1977
1977, 181p AID-PN-AAG-828

Keywords: *Potatoes, *Plant diseases, Viruses, Meetings, Tolerances(Physiology), Histology, Plant genetics, Virology, Developing country application.

The report presents the proceedings of the fourteenth planning conference on developments in the control of potato virus diseases, held CIP in Lima, Peru, November 14-18, 1977. Sixteen papers written by conference participants concerning virus resistance, virus properties, virus testing, antiserum production, histological staining methods, methods for breeding virus resistant potatoes, virus detection, and plant virology are presented.

PB81-198378 PC A07/MF A01
Office of Water Research and Technology, Washington, DC.
Water Resources Thesaurus, Third Edition
1980, 137p* OWRT/IT-80/1, W81-02718

Keywords: Thesauri, *Water resources, Subject index terms, Information retrieval, Documentation, Vocabulary, *Information services, Dictionaries, Classifications, Subject indexing.

The third edition of the Water Resources Thesaurus, which represents a major revision of the previous 1971 edition, provides a vocabulary for indexing and retrieving the literature of water resources research and development. The terms in this edition were selected from the more than 105,000 indexing terms used in the 'Selected Water Resources Abstracts'. Some high frequency terms were excluded because they were too broad or ambiguous. Also deleted were the names of specific legislative acts, rivers, oceans, bays, birds, and most chemical terms. Due to changes in retrieval capability, such as text searching, this edition emphasizes terms useful for classifying or grouping specifics because such terms are needed in selecting subsets, but may not appear in the abstract. The Thesaurus has three sections: Thesaurus of Descriptors, Descriptor Words, and Descriptor List. The Thesaurus of Descriptors, the main indexing and retrieval tool, is an alphabetical list of terms interfiled with five types of cross-references: USE, Used For, Broader Term, Narrower Term, and Related Term. Descriptor Works is an alphabetical listing of each significant word comprising a term in the Thesaurus. The Descriptor section contains all approved terms, allowing for quick verification of terms and their spelling.

PB81-198467 PC A05/MF A01
Oklahoma State Univ., Stillwater. Coll. of Business Administration.
The Use of Economic Models in Evaluating the Impact of Rural Development and Income Redistribution Programs in the LDC's
Working paper no. 38
Michael J. Applegate. May 75, 95p AID-PN-AAG-784

Keywords: Economic models, Developing countries, Economic development, Rural areas, Income, Agriculture, Technology assessment, *Guatemala, Land use, Social welfare, *Socioeconomic status, Industrial development, Developing country application.

Whether rural development results in a redistribution of income in favor of the poor is an unresolved question in the development literature. This study approaches this question by analyzing the use of existing economic models to evaluate the impact of rural development and allied income redistribution programs in LDC's. In part one, two-sector models of economic dualism are discussed in regard to their implications for improving income distribution between agricultural and nonagricultural sectors and for agricultural development policy. The use of quantitative techniques to measure the effects of changes in the size distribution of income is examined in part two. In part three, some recent attempts to measure the effects of technology and of various inputs, such as credit and technical assistance, are analyzed. The final section presents a dynamic multisectoral model of Guatemala used for measuring the effects both of technological change in the traditional agricultural sector and of a proposed land reform program. A bibliography containing 40 titles in both English and Spanish is also included.

PB81-199184 Not available NTIS
National Bureau of Standards, Washington, DC.
The Microeconomics of Solar Energy
Final rept.
R. T. Ruegg, and G. T. Sav. 1981, 42p
Pub. in Chapter 28 in Solar Energy Handbook, p28,1-28,42 1981.

Keywords: Cost effectiveness, Economic analysis, Discounted cash flow, Cost estimates, Design, Size determination, Performance evaluation, *Solar heating systems, Life-cycle cost, Financial incentives.

The purpose of this chapter is to explain and illustrate how the techniques of microeconomic analysis can be used in the design, sizing, and evaluation of solar energy systems. For the purpose of exposition, the focus is on solar hot-water and space-heating systems for residential and commercial buildings. However, the basic concepts and procedures will generally apply to the analysis of solar energy in diverse applications, e.g., industrial process heat systems, power production, and total energy systems.

PB81-202285 PC A05/MF A01
Fund for Multinational Management Education, New York.
Business-Government Cooperation in Science and Technology for Development. Seminar Report, May 10-11, 1979, Rio de Janeiro, Brazil
Alejandro D. Sans, and Harvey W. III Wallender.
1979, 93p
Contract DOS-1722-720261
Prepared in cooperation with Confederacao Nacional da Industria, Council of the Americas, U.S. Chamber of Commerce, and United States Council of the International Chamber of Commerce.

Keywords: *Technology transfer, Economic development, Meetings, Technological intelligence, Technology innovation, Businesses, Government policies, Cooperation, *Brazil, *Research and development.

The seminar was designed to provide a forum in which business and governments could exchange views and identify practical ways of resolving problems in the application of science and technology to economic growth. The report is a summary of the issues and proposals discussed at the seminar.

PB81-202525 PC A03/MF A01
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Mechanical Engineering.
Solid Waste Disposal and Resources Recovery by Composting Processes, Part I
Technical rept.
Raul R. Cardenas, Jr, and Lawrence K. Wang. Jan 81, 42p* Rept no. SIT-ME/0*-81/3
Prepared in cooperation with Polytechnic Inst. of New York, Brooklyn.

Keywords: Solid waste disposal, Biodeterioration, Composts, Microorganisms, Soils, Classification, Sewage, Industrial wastes, Performance evaluation, Biochemistry, Aerobic processes, Anaerobic processes, Biological processes, *Waste recycling.

The microbiology, classification, biochemical reactions and engineering design approach of biological composting process are presented and discussed. Topics include microorganisms, aerobic and anaerobic systems, mesophilic and thermophilic temperatures, windrow and mechanical compostings, bath and continuous operations. compostable materials, and conventional and unconventional methods. Major process/operation sequence in composting, such as pretreatment, digestion, curing, finishing, upgrading and storage, are summarized and assessed.

PB81-203523 PC A14/MF A01
Research Triangle Inst., Research Triangle Park, NC. Center for Technology Applications.
Exploratory Study of Possible Technological Innovation in Footwear Manufacturing Stitching Room Operations. Volume I: Technical Discussion. Volume II: Appendices
Technical rept. (Final).
Apr 81, 310p EDA-81-076
Grant EDA-99-26-09881-10
Prepared by Kaplan (J. B.) and Co., Inc., Bridgeport, CT.

Keywords: Technology innovation, Manufacturing, Shoes, Sewing, Cost analysis, Specialized training, *Footwear, Manpower, Machine design, Sewing machines.

The study was initiated by the Research Triangle Institute with a view toward determining the probability and feasibility of technological innovations which could contribute significantly to reductions in footwear Stitching Room costs. Designed as exploratory, its mission was viewed as somewhat speculative since innovation futures readily elude realization for an array of reasons both technical and economic. The study focused upon the non-rubber shoe industry.

PB81-204059 PC A04/MF A01
Intermediate Technology Development Group, London (England).

Manual de Construccion de un Ariete Hidraulico para Bombear Agua. (Intermediate Technology Development Group, London (England).)
S. P. Watt. c1978, 61p*
Text in Spanish.

Keywords: Hydraulic equipment, Rams(Pumps), Construction, Construction materials, Fluid flow, Design, Valves, Assembling, Pipe fittings, Water supply, Foreign technology, Developing country application, *Hydraulic rams.

This report is designed for readers with no specialized knowledge of hydraulics who will have access only to basic machine tools and a few common engineering materials. It is a step-by-step guide to the hydraulic ram. It is shown how it works, how to choose the site and how to make, set and work a hydraulic ram.

PB81-204174 PC A23/MF A01
Economic Development Council of Northern Vermont, Inc., Saint Albans.
Technology Utilization in Rural Development
Apr 80, 550p* [illegible]-01-077

Keywords: *Industrial plants, Vermont, *Wood products, *Forestry, Lumber, Site surveys, Feasibility, Project planning.

The primary goal of this study is to secure a comprehensive evaluation of the feasibility of establishing a plant for pressure treating native softwoods and/or hardwoods with one or more of several existing chemical processes to retard the incidence of rot and insect attack. A second goal is to evaluate the market for treated wood products together with a priority stated for type of product and process best suited to the market area and wood available. The objective of the study is to make available this information to any interested party in an effort to achieve added value to forest products produced in the area and to justify efforts to attract such industry to the area. The Northern Vermont Resource Conservation & Development Area strongly feels that such a plant would benefit the community.

PB81-204273 PC A11/MF A01
Michigan Univ., Ann Arbor. Dept. of Medical Care Organization.
Rural Health Care and Telemedicine. A Study of a Rural Health Care System and Interactive Television. Volume I: Project Summary
Interim rept.
Rashid L. Bashshur, Patricia Armstrong, Susan Hayward, Gerald Aldridge, and Stephanie Fidel. Jun 75, 242p NSF-RA-S-75-147
Grant NSF-G1-41770

Keywords: Information systems, Medical services, Hospitals, Telecommunication, *Television, Utilization, Availability, Rural areas, Communities, Accessibility, Rural health services, *Health care delivery, Health care technology, Quality assurance, Maine, Delivery of health care, Telemedicine, Medical information systems, Franklin County(Maine), Communication networks.

This study examines the efficacy of an innovative system for health care delivery in a rural environment and responses to it by public and private sectors. The system integrates a poverty population into an ongoing fee-based group practice organization on a prepaid basis and simultaneously introduces an interactive two-way television (IATV) to aid the delivery of health services in three geographically remote satellite stations in Franklin County, Maine. The impact of the organization, known as the Rural Health Associates (RHA), and the telecommunication technology on the service population is ascertained in terms of availability, accessibility, quality, and cost of health care. The specific role and performance of IATV in health care delivery in the context of RHA is analyzed. Chief characteristics of the RHA program and primary uses of IATV are outlined. The methodology is presented for implementing the system and consists of basic attitudinal questions to be addressed, sampling procedures, and data collection instruments. Questionnaires in the appendices include a community survey, a community leader survey, a provider study, and an IATV user study.

PB81-204414 PC A05/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Un Sistema Economico de Calefaccion Solar para Viviendas. (An Inexpensive Economical Solar Heating System for Homes).
Johnny W. Alfred, Joseph M. Shinn, Jr, Cecil E. Kirby, and Sheridan R. Barringer. Jul 76, 80p*
Text in Spanish.

Keywords: Residential buildings, *Houses, Installing, Manufacturers, Cost analysis, Performance evaluation, *Solar heating systems, Developing country application.

This report describes a low-cost solar home heating system to supplement the home-owner's present warm-air heating system. It has three parts: (1) A brief background on solar heating, (2) Langley's experience with a demonstration system, and (3) information for the home-owner who wishes to construct such a system. Instructions are given for a solar heating installation in which he supplies all labor needed to install off-the-shelf components estimated to cost $2000. These components, which include solar collector, heat exchanger, water pump, storage tank, piping, and controls to make the system completely automatic, are readily available at local lumber yards, hardware stores, and plumbing supply stores, and they are relatively simple to install. Manufacturers and prices of each component used and a rough cost analysis based on these prices are given for the owner's convenience. This report also gives performance data obtained from a demonstration system which has been built and tested at the Langley Research Center.

PB81-204729 PC A02/MF A01
Ahmedabad Textile Industry's Research Association (India).
Hue Factor - A Measure of Heat Utilisation Efficiency of a Mill
Research note
J. S. Parajia, M. Ratna Prabhu, and K. Subrahmanyam. Mar 76, 19p Rept no. ENG-78

Keywords: *Textile industry, Textile processes, Thermal efficiency, Heat loss, Boilers, Fuel consumption, Steam, *Energy management, *India, Foreign technology.

Efficient utilization of heat is a matter of great importance since fuel is becoming progressively more scarce and expensive. In order to assess the heat utilization efficiency of a mill as a whole, certain standards are to be had for steam and fuel consumption. These standards are the norms which on one hand signify an ideal efficiency but on the other, they are also totally practical and achieved under normal working conditions in mills. The first part of this paper therefore, deals with the norms and the second part, the method of computation of HUE factor where HUE stands for Heat Utilization Efficiency. Having defined the HUE factor and described the norms for various processing machines in the first part, Part II deals with the application of these concepts to evaluate the HUE factor of a mill. Various unavoidable fuel losses in a mill are enumerated; the fuel consumption norm is defined and details of how to calculate the HUE factor are explained. Possible uses of the HUE factor approach are also given and methods of improving HUE factor briefly covered at the end.

PB81-208146 PC A07/MF A01
Simco, Inc., Weston, CT.
The Chinese Tallow Tree as a Source of Petroleum Substitutes, Phase I
Final rept.
H. W. Scheld, S. I. Mason, N. B. Bell, A. D. Krikorian, and G. N. Cameron. 28 Feb 81, 136p* NSF/PCM-81003
Grant NSF-PFR80-10567
Prepared in cooperation with Houston Univ. at Clear Lake, New York State Univ. at Stony Brook, and Houston Univ., TX.

Keywords: *Vegetable oils, Crude oil, Trees(Plants), Substitutes, Cultivation, Seeds, Drainage, Salinity, Ecology, *Plants(Botany), *Oil, Environmental impacts, Harvesters, Design, Chemical analysis, Lipids, Fats, Tallow, Polymers, Protective coatings, Graphic arts, Lubricants, Sapium sebiferum, Chinese tallow tree, Underutilized species, Cosmetics.

Growth habits, production, and seed characteristics of the wild Chinese tallow tree (Sapium sebiferum (L.) Roxb.) were investigated, since seeds from this tree could be a major source of vegetable fats and oils and a substitute for petroleum. The Chinese tallow tree grows well on poorly drained or saline soil. Seeds were selected for future projects; methods of clonal propagation were investigated; management and the ecological impact of large plantings were studied; and the design of a mechanical harvester was discussed. Chemical analysis of seed components indicates that the seeds contain high proportions of two lipid fractions in the seed oil, and a heavy fat or tallow in the seed coating. Both tallow and oil can be substituted for current commercial products, and the rare estolide fraction of the oil may have special uses in the field of synthetic polymers. Possibilities for use of tallow tree seed oil in the protective coatings, artists' supplies, synthetic lubricants, toiletry and cosmetics, and fatty chemicals industries were discussed.

PB81-206187 PC A03/MF A01
Glass and Ceramics International, Inc., Lomita, CA.
Development of Mineral Wool from Industrial Wastes. Phase I
Final rept. 1 Sep 80-28 Feb 81
M. Akbar Ali. Feb 81, 48p NSF/ISP-81008
Grant NSF-ISP80-09362

Keywords: *Mineral wool, *Industrial wastes, Solid waste disposal, Coal, Kilns, *Waste recycling.

The feasibility of using unprocessed industrial wastes to produce mineral wool was investigated by literature and patent searches and by experimental production of mineral wool. Slag ash from coal burning utilities and cement kiln waste from cement companies were combined in batch formulations having acid to alkali ratios of 0.8 to 1.2, then melted, fiberized, and analyzed for physical, thermal, chemical, and optical properties. Cement kiln waste added to the slag ash in controlled quantities served as a fluxing agent, and lowered the melting point of the slag ash from 2800 degrees F to 2500 degrees F. The softening point of the fibers was between 1250 degrees F and 1480 degrees F. The surface of the fibers was smooth at a magnification of 800x, and X-ray analysis showed no crystallization. The glasses were chemically stable, and possessed the rheological properties necessary to produce mineral wool. Potential applications include using the mineral wool for insulation. Immersion in cement slurry for 24 hours did not affect the fibers, indicating that they might also be used as alkali resistant components for fiber-reinforced concrete.

PB81-207870 PC A02/MF A01
Meir (Tamari), Monsey, NY.
The Effects of Changes in the Business Cycle on Small Firms
Final rept.
Meir Tamari. May 81, 23p*
Sponsored in part by Small Business Administration, Washington, DC.

Keywords: Business cycles, Economic impact, Sales, Profits, Liabilities, Corporations, Economic analysis, *Small businesses, Entrepreneurship, Organization size(Groups).

The study constructs an index for monitoring the effect of changes in business conditions on the small firms so that fiscal, monetary, and other policies can be adjusted accordingly.

PB81-209512 PC A04/MF A01
International Fertilizer Development Center, Muscle Shoals, AL.
The Bangladesh Fertilizer Sector
Yao H. Chuang, John M. Hill, and Bill H. Barnett. Oct 78, 65p IFDC-T-11, AID-PN-AAG-791
Grant AID/ta-G-1218

Keywords: *Fertilizers, *Bangladesh, Plant nutrition, Subsidies, Cargo transportation, Supply(Economics), Demand(Economics), Utilization, Agricultural chemistry, Packaging, Production, Developing country application.

Despite a significant increase since its inception in 1952, current fertilizer use in Bangladesh is far below the recommended rate; and local production and distribution are inadequate to meet domestic needs. The

report analyzes current and potential problems of Bangladesh's fertilizer sector and recommends projects and studies to solve them.

PB81-209538 PC A02/MF A01
Arizona Univ., Tucson. Dept. of Agricultural Economics.
Potentials and Pitfalls of Product Marketing through Small Farmer Groups
Roger Fox. 1978, 20p AID-PN-AAH-063
Contract AID/NE-C-1578
CENTO Seminar on Increasing the Productive Capacity of Small Farmers Held at Lahore, Pakistan on December 17-21, 1978.

Keywords: *Marketing, *Agricultural economics, Farms, Sales management, Productivity, Distribution systems, Agricultural products, Developing countries, *Small businesses, Farmers, Developing country application, Cooperatives.

The report was prepared for and presented at the CENTO seminar held in Lahore, Pakistan in December 1978 on increasing the productive capacity of small farmers. The potentials and pitfalls of product marketing through group action by small farmers are investigated in this paper. However, it must be recognized that policy decisions about group action programs for small scale producers should be based on a consideration of both their production and marketing potential as well as certain idealogical goals that may exist. Only a partial analysis of the issues involving group action is offered.

PB81-209546 PC A03/MF A01
International Fertilizer Development Center, Muscle Shoals, AL.
Management of Phosphorus Fertilizers in Establishing and Maintaining Improved Pastures on Acid, Infertile Soils of Tropical Latin America
W. E. Fenster, and L. A. Leon. 1978, 34p AID-PN-AAG-790
Grant AID/ta-G-1218
Prepared in cooperation with Centro Internacional de Agricultura Tropical.

Keywords: Farm management, *Fertilizers, Agricultural chemistry, *Latin America, Soil chemistry, *Soils, Phosphorus, Forage crops, Soil analysis, Forage grasses, Cost engineering, Developing country application.

The Oxisols and Ultisols (soil types) of tropical Latin America have a high phosphorus fixation, so that substantial amounts of phosphorus must be added to satisfy the requirements of the soils and of the plant species which grow in them. The extremely low levels of both total and available phosphorus therefore create a major problem in establishing and maintaining improved pastures on these soils. Because of these constraints, along with the high unit cost of phosphorus fertilizers, alternative methods of managing improved pastures must be considered. This paper considers four economical methods of improving forage production while still satisfying the phosphorus requirements of the plant.

PB81-209603 PC A04/MF A01
International Fertilizer Development Center, Florence, AL.
The Potential for Regional Cooperation in Fertilizer: A Methodology Study
Thomas H. Foster, Owen W. Livingston, and Paul J. Stangel. 1976, 58p IFDC-T-2, AID-PN-AAG-785
Grant AID/ta-G-1218
Sponsored in part by World Bank.

Keywords: *Fertilizers, *Southeast Asia, *Agricultural economics, Regional planning, Cooperation, Investments, Production, Imports, Cost engineering, Tables(Data), Developing country application.

Due to world fertilizer market instability and the importance of fertilizer as a strategic policy tool, the members of the Association of Southeast Asian Nations (ASEAN), plan to devise a policy to develop adequate, dependable, low-cost fertilizer supply alternatives. Under consideration is an expanded fertilizer production policy utilizing the concepts of economic cooperation and regional integration. This study provides a preliminary methodological study of the potential benefits of this policy using a mathematical programming model to determine the investment, production, importation, and transportation patterns that minimize the costs of meeting ASEAN's 1985 fertilizer requirements.

PB81-209611 PC A14/MF A01
Cornell Univ. Agricultural Experiment Station, Ithaca, NY. Dept. of Agricultural Economics.
Poor Rural Households, Technical Change, and Income Distribution in Developing Countries: Insights from Asia
Agricultural economics research rept.
Daniel G. Sisler, and David R. Colman. 1979, 323p A.E.RES-79-13, AID-PN-AAG-936
Contract AID/ta-C-1327

Keywords: Developing countries, Low income groups, Agricultural engineering, Income, Asia, *Socioeconomic status, Rural areas, Households, Distribution systems, Technology innovation, Farm management, *Rice, *Pesticides, *Fertilizers, *Water management, *Farming, Developing country application.

Although the population of Asia is immense, its land mass vast, and its agriculture varied, one factor, rice, serves as a common denominator for this disparate group of nations and people. This report, concentrating on wetland rice production, assesses how the adoption of improved agricultural technology has influenced agricultural production and income distribution on small Asian farms. Asian rice yields have increased significantly over the past decade through use of modern varieties, fertilizers, agricultural chemicals, and water management techniques. Concern is increasing as to the way the benefits have been distributed among rural families, and its effect.

PB81-209678 PC A03/MF A01
Illinois Univ. at Urbana-Champaign. Coll. of Agriculture.
Whole Soybean Foods for Home and Village Use
International Soybean Program rept.
A. I. Nelson, M. P. Steinberg, and L. S. Wei. May 78, 36p INTSOY-14, AID-PN-AAG-984
Contract AID/ta-C-1294

Keywords: *Food processing, *Soybeans, Developing countries, Oilseeds, Proteins, Humans, Milk, India, *Food products.

Commercial processing of whole soybeans, a high-protein, low-cost food source, must be simplified if soy products are to have wide applicability as a food source for the undernourished of developing countries. This document contains five papers that develop concepts, methods, and processes for home use of the whole soybean for human food consumption.

PB81-209959 PC A04/MF A01
Kansas State Univ., Manhattan. Food and Feed Grain Inst.
Developing an Appropriate Grain Storage System
Research rept. no. 8
Dale G. Anderson. 1978, 53p AID-PN-AAG-989
Contract AID/ta-C-1162

Keywords: Grain crops, *Food storage, Farm crops, Grain elevators, Stockpiling, Cost analysis, Cash flow, Guidelines, *Grains(Food), Developing country application.

Grain storage problems in LDCs are becoming increasingly critical. This document discusses this subject by presenting a computerized model for storage planning which was developed by Kansas State University. Since the model is complex, the document's focus is on offering general guidelines in the areas of storage facility size, location, type, and pricing.

PB81-210148 PC A02
New York Sea Grant Inst., Albany.
Recovery, Utilization and Treatment of Seafood Processing Wastes
L. F. Hood, and R. R. Zall. 1979, 10p NOAA-81042006

Keywords: Seafood, *Food processing, *Waste treatment, Clams, Coagulants, Recovery, Spisula solidissima, Sea Grant program.

Shellfish and finfish processors are faced with increasing problems of waste handling and disposal, plant sanitation, raw material availability and cost, production efficiency, and escalating labor and energy costs. Conversion of unused waste materials into marketable products not only provides such opportunities but reduces waste disposal problems. The objectives of the work have been threefold: (1) recovery of protein, other nutrients and flavor materials from fish-processing wastes, (2) conversion of the recovered materials into food ingredients or marketable food products, and (3) development of procedures for (pre)treating the non-recoverable solids. The goal has been to attain total utilization of seafood processing wastes for food or feed.

PB81-210494 PC A08/MF A01
California Univ., Davis.
Evaluation of New Species of Drought Tolerant Plants for Highways
Final rept. Jun 75-Jun 80
Martha A. Conaway, and Robert L. Thayer, Jr. Jan 81, 115p FHWA/CA-80/02
Sponsored in part by California State Dept. of Transportation, Sacramento. Office of Landscape Architecture.

Keywords: *Plants(Botany), Highways, Droughts, Tolerances(Physiology), Germination, Trees(Plants), Shrubs, Vegetation, Climate, Cultivation, Plant reproduction, Performance evaluation, Sites, Esthetics, Weed control, Fruit crops, Attractants, Plant diseases, Insect control, Maintenance, California, *Roads, Highway beautification, Drought tolerance.

This report describes results of a research project (carried out from January, 1973 to January, 1980), intended to identify and introduce into use a wide array of drought tolerant, low maintenance, native and exotic trees, shrubs and ground covers. These plants are specifically intended for highways in those areas of California characterized by a Mediterranean climate. One hundred and seven (107) plant species were planted out between 1975-76 at seven highway and one nonhighway location(s). This final report describes the methods and results of the field tests.

PB81-210510 PC A16/MF A01
Stanford Univ., CA. Inst. for Communication Research.
An Annotated Listing of Training Institutions Offering Communications Courses to Developing-Country Personnel
Jeanne Moulton, and Peter Spain. Jul 78, 352p AID-PN-AAH-142
Contract AID/ta-C-1472

Keywords: Specialized training, Developing countries, Telecommunications, Radio broadcasting, Schools, *Training, *Communications, Developing country application, Curricula.

In anticipation of an increasing demand for training in development communications and educational technology for personnel from developing countries, A.I.D. commissioned an overview of U.S. and European institutions offering graduate training in these areas. Course orientations and faculty background germane to developing country needs are highlighted. Emphasis is placed on training in broadcasting and in social science approaches to communication and development. Journalism training or training in the engineering aspects of communications are excluded.

PB81-210536 PC A05/MF A01
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Cooperatives, Initiative, Participation and Socio-Economic Change in the Sahel
Bill Derman. 1978, 82p AID-PN-AAH-310
Contract AID/afr-C-1260

Keywords: Social change, *Sahel, Marketing, *Socioeconomic status, Sudan, Agriculture economics, Animal husbandry, Economic development, Low income groups, *Agricultural cooperatives, Cooperatives, Developing country application.

Are the Sahelian peasants and herders, who have resisted change and refused to become market-oriented, irrational. Some theorists of development have reached that conclusion. Others take the viewpoint that there are a variety of paths to development, and that one should expect to find greater variability in the responses of rural peoples. The author of this report aligns himself with the latter viewpoint, emphasizing that the Sahel has never been an unchanging area.

Indigenous initiative is just as characteristic of the Sahel as stability and tradition. Examples are cited. The report also focuses on the role of cooperatives and the degree of local participation generated by them. Experiences in Senegal, Mali, and Niger are related through quotations from a number of studies.

PB81-210775 PC A99/MF A01
Colorado State Univ., Fort Collins.
Improving Irrigation Water Management on Farms
Rept. for 1 Apr 78-31 Mar 79.
30 Jun 79, 660p AID-PN-AAG-847
Contract AID/ta-C-1411

Keywords: Farm crops, Water distribution, *Irrigation, *Pakistan, Soil water, Distribution systems, *Water supply, Waterways(Water courses), Education, Losses, Economic factors, Cotton plants, Rice plants, Fluid infiltration, Water quality management, Rural areas, Developing country application.

The irrigation system of Pakistan represents one of the largest modern conveyance systems in the world and is a marvel of engineering skill and technology. There are, however, many problems concerning the farm-level portion of the system. This document reports on the progress of Colorado State University (CSU), contracted under an AID-funded project to assist the Pakistani farmer operate and manage the water from the canal outlet through the irrigated field.

PB81-210916 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
An Analysis of the Labor-Intensive Continuous Rice Production System at IRRI
Research paper series
Y. Morooka, R. W. Herdt, and L. D. Haws. May 79, 44p IRPS-29, AID-PN-AAH-235

Keywords: Planting, Harvesting, *Rice, *Philippines, Production, Land use, Labor, Water consumption, Capital, Yield, Foreign technology, Developing country application.

A thrice-weekly rice planting and harvesting system on 250 sq m plot is evaluated. The system is compared with conventional production systems in the Philippines and elsewhere in terms of production, land use, labor use, labor distribution, water requirement, capital use, and economics of the system. The continuous rice production system (rice garden) efficiently utilizes about twice as much as labor, uses land fully throughout the year, and produces three times the output of conventional two-crop rice production systems.

PB81-210932 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Determining Superior Cropping Patterns for Small Farms in a Dryland Rice Environment: Test of a Methodology
Research paper series
D. P. Garrity, R. R. Harwood, H. G. Zandstra, and E. C. Price. Jul 79, 14p IRPS-33, AID-PN-AAH-234

Keywords: *Arid land, *Rice, *Philippines, Rotation, Planting, Corn plants, Pests, Tolerances(Physiology), Yield, Field crops, Foreign technology, Developing country application.

A methodology for cropping systems research, proposed in 1975, involved the farmer as an active participant in the research, with test patterns grown on his land under joint farmer-researcher management. Experience with the use of this methodology in developing a dryland rice-based cropping systems test site in the Philippines is discussed. The potential for increased crop productivity in the major dryland rice-producing region of eastern Batangas province, where the predominant cropping pattern involves dryland rice followed by field corn, was studied by testing the impact of these cropping pattern alternatives: following rice with field crops other than the local organe flint corn, an intercrop pattern, and a three-crop-per-year pattern.

PB81-210940 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Farm Mechanization, Employment, and Income in Nepal: Traditional and Mechanized Farming in Bara District
Research paper series
S. P. Pudasaini. Aug 79, 12 IRPS-38, AID-PN-AAH-230

Keywords: Agricultural engineering, Technology innovation, Farms, *Employment, Income, *Nepal, *Agricultural machinery, Economic impact, Agricultural economics, Yield, Production, Farm management, Labor estimates, Developing country application.

A survey of traditional and mechanized farms in Bara district, Nepal, was conducted to assess the impact of mechanization on cropping intensity, timeliness, yields, income, employment, and efficiency. Cropping intensity, yields, income, and employment were higher on mechanized than on traditional farms.

PB81-210957 PC A06/MF A01
International Fertilizer Development Center, Muscle Shoals, AL.
Fertilizer Mixing Plant Feasibility Study
M. Terry Frederick, and Robert T. Smith. Nov 78, 106p IFDC-00215-78, AID--PN-AAG-787
Contract AID-511-165T

Keywords: *Fertilizers, Demand(Economics), Feasibility, *Bolivia, Farm crops, Soils, Manufacturing, Cargo transportation, Developing country application.

In August 1978, USAID/Bolivia requested the International Fertilizer Development Center to prepare a feasibility study for a fertilizer mixing plant in Bolivia. Emphasis was to be placed on an analysis of existing and potential fertilizer demand among small farmers. This document presents that study. After an overview of the Bolivian climate, soil, and crop production, current exploitation of Bolivia's major fertilizer raw materials is described. Next, the nation's infrastructure and its influence upon the farming sector are outlined. Succeeding section treats community development programs, extension services, etc. Several conclusions are drawn. A bibliography of English and Spanish sources is included.

PB81-211005 PC A04/MF A01
International Fertilizer Development Center, Muscle Shoals, AL.
Utilization of Phosphate Rock in Tropical Soils of Latin America
W. E. Fenster, and L. A. Leon. Mar 78, 53p AID-PN-AAG-789
Grant AID/ta-G-1218
Prepared in cooperation with Centro Internacional de Agricultura Tropical.

Keywords: *Soils, *Fertilizers, Developing countries, *Latin America, Developing country application, *Phosphates.

The high cost of fertilizers, especially those containing high amounts of phosphorus, is one of the main limiting factors in increasing crop production in tropical Latin America. The direct use of phosphate rock or of some of its low-input altered products would seem to present a logical approach to overcoming this constraint. This paper selectively reviews the literature on soils and phosphorus fertilizer problems in tropical Latin America, identifies objectives for further research, and outlines a research program to meet those objectives. Various charts and graphs and a 51-item bibliography (1943-77) of English, Spanish, and Portuguese language references are also included.

PB81-211112 PC A02/MF A01
New York Sea Grant Inst., Albany.
Development of Products from Minced Fish: Booklet 8. Canned Minced Fish
R. C. Baker, J. M. Darfler, and E. J. Mulnix. 1980, 22p NYSG-B-8, NOAA-81042001

Keywords: *Fishes, *Food processing, Yield, Byproducts, Acceptability, Flavor, Texture, Food additives, Frozen foods, Acceptability, Sea Grant program, Catostomus commersoni.

Canned minced mullet was developed as a lower priced alternative to canned grated tunafish. Precooking procedures were evaluated for precook yield, amount of drip (cookout) in cans, and the most desirable product in terms of color, texture, tenderness, juiciness, flavor, and overall acceptability. The procedure that produced the best product is described.

PB81-211443 PC A08/MF A01
Bureau of the Census, Washington, DC.
A Compilation of Age-Specific Fertility Rates for Developing Countries
International research document no. 7.
1979, 161p ISP-RD-7, AID-PN-AAH-250

Keywords: Developing countries, Fertility, Africa, Asia, Latin America, Oceania, Census, Surveys, Vital statistics, *Birth control, Statistical data, Age groups, Birth rate, Foreign technology, Health statistics, Natality.

To interpret fertility levels and patterns for a given country, it is useful to examine a consistent set of fertility data. This publication presents a compilation of age-specific and total fertility rates for 126 LDCs of Africa, Asia, Latin America, and Oceania. Rates are shown either directly, as derived from vital registration systems, surveys, or censuses, or as adjusted by various techniques, particularly the Brass fertility technique.

PB81-212052 PC A04/MF A01
Academy for Educational Development, Inc., Washington, DC.
Rural Adult Education and the Role of Mass Media: A Comparative Analysis of Four Projects
Frans Lenglet, and Emile G. McAnany. Aug 77, 68p AID-PN-AAG-834
Contract AID/afr-C-1158
Prepared in cooperation with Stanford Univ., CA. Inst. for Communication Research.

Keywords: *Education, Adults, Television systems, Rural areas, Developing countries, *Ivory Coast, Developing country application.

The paper is meant to compare four rural adult education projects that use media as an important component. It describes each project in some detail, giving special attention to the following characteristics: objectives; organization; selection and recruitment of supervisiors, monitors and participants; use of communication media; feedback and evaluation systems; impact (insofar as evidence is available) and constraints. Such an examination should provide the reader with a general understanding of how each system operates and its strong and weak points within its own context. Equally important for the reader is the judgement of whether the variety of approaches represented here has anything to offer other countries who are facing similar problems in rural education. A more specific purpose of the paper is to provide decision-makers in the Ivory Coast with a brief analysis of their own Extra-Scolaire project, along with three other approaches to adult education (from Tanzania, Guatemala and the Dominican Republic). Such an analysis should help them reexamine their own efforts in the light of evaluation evidence on their own and other cases.

PB81-212284 PC A06/MF A01
Academy for Educational Development, Inc., Washington, DC.
The Impact of 25 Television Programs on 'Water' Produced and Broadcast by the Ivorian Out-of-School Education Project
Frans Lenglet. 1976, 110p AID-PN-AAG-831
Contract AID/afr-C-1158

Keywords: *Education, *Water supply, *Ivory Coast, Television broadcasting, Incentives, Instructions, Rural areas, Motivations, Developing country application.

In an attempt to help villages of the Ivory Coast deal with the water supply problem, especially during the dry season, the Ivorian Out-of-School Education Department broadcast a series of 25 TV programs on water and related issues during the period November 1974 to December 1975. This report evaluates the reach and impact of these programs, which constitute one element of a massive Ivorian Government information and education campaign on hygienic and sanitary measures and the use of drinking water. After a brief introduction, the research design and the evaluation methodology are outlined. Next a discussion of the content of the 25 water programs, their development, and their outreach is presented. The programs dealt with the basic problems of water supply, quality, and

pollution, the relationship between contaminated water and disease, and the various possibilities and means to obtain safe(r) drinking water. Three types of objectives were pursued by these programs and by discussion sessions led by local animators following each broadcast: (1) sensitization and information; (2) understanding and learning; (3) incitement to action.

PB81-212789 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Genetic Analysis of Traits Related to Grain Characteristics and Quality in Two Crosses of Rice
Research paper series
B. Soomrith, T. T. Chang, and B. R. Jackson. Aug 79, 17p Rept nos. IRPS-35, AID-PN-AAH-233

Keywords: Hybridization, *Rice, Developing countries, Plant genetics, Yield, Quality, Breeding, *Philippines, Foreign technology, Developing country application.

A genetic study was made on the rice crosses IR648-3-1-2-3/Gow Ruang 88 and IR648-3-1-2-3/Khao Pahk Maw 148 to determine the genetic components of five grain characteristics and plant type, and the genotypic relationship between the two groups of characters. The genetic materials in each cross included the two parents and F1, F2, F3, B2S populations grown in replicated plots. The different types of gene effects controlling selected traits and the independence between the yield component characters and grain characteristics found in this study provide directions in formulating useful effective selection procedures for specific traits or the combination of desired traits in a breeding program.

PB81-212813 PC A03/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Aliwalas to Rice Garden: A Case Study of the Intensification of Rice Farming in Camarines Sur, Philippines
Research paper series
Y. Morooka, P. Masicat, V. Cordova, and R. W. Herdt. Aug 79, 26p Rept nos. IRPS-36, AID-PN-AAH-236

Keywords: Production, *Rice, *Philippines, Magnitude, Food, Growth, Land use, Cultivating, Planting, Manpower, Income, Asia, Foreign technology, Developing country application, Luzon(Philippines), Land reform.

Frustration with the failure to achieve national development goals, caused by population growth rates exceeding those of food production, promotes the idea that agriculture in developing countries is static. Close examination often shows exactly the opposite, however. In the Philippines' Bicol region (the southern extreme of Luzon), the traditional system of rice cultivation called aliwalas involved little effort. Rice was transplanted and harvested with little farmwork activity between. After land reform and technonogical change, some farmers began to intensify their production systems. This case study traces the intensification process for one farmer who began with the aliwalas system in the 1950s and was growing rice continuously by the 1970s. He now employs about twice as much labor as most conventional rice farmers and generates an annual net income of more than P7,000/ha.

PB81-213241 PC A03/MF A01
Moulton Niguel Water District, Laguna Niguel, CA.
Wastewater Treatment by Rooted Aquatic Plants in Sand and Gravel Trenches
Final rept. Aug 77-Aug 79
Pamela R. Pope. Jun 81, 31p EPA-600/2-81-091
Grant EPA-R-805279

Keywords: *Aquatic plants, *Sewage treatment, Municipalities, Sands, Gravel, *Waste water, Harvesting, Effectiveness, Ditches, Reeds(Plants), Manpower, Energy, Equipment, California, Phragmites, Scirpus, Reeds, Bulrush, Secondary treatment.

The objective of this project was to evaluate a patented process developed by the Max Planck Institute (MPI) of West Germany for the treatment of industrial wastes, as an energy-efficient method for the treatment of municipal wastewater. The major goal was to achieve effluents meeting the United States Federal Effluent Standards by this novel biological treatment process that uses a minimal amount of mechanical equipment and does not require a great amount of manpower for normal operation. An eleven-month study demonstrated that raw screened wastewater applied to the trench system at a rate not exceeding 95 m3/d (25,000 gpd) could be treated to secondary effluent quality. Spatial requirements were about the same as for a septic tank system.

PB81-213522 PC A03/MF A01
Ghana Univ. Medical School, Accra.
Experience in Selecting, Training and Supervising Interviewers in a Rural Health Project: Danfa Project, Ghana. Danfa Comprehensive Rural Health and Family Planning Project, Ghana
D. W. Belcher, F. K. Wurapa, I. M. Lourie, K. Kwabia, and S. K. Avle. Dec 76, 33p MONO Ser-11, AID-PN-AAH-270
Prepared in cooperation with California Univ., Los Angeles. School of Public Health.

Keywords: *Ghana, Family planning, Recruiting, Specialized training, *Training, *Birth control, Interviewers, Health surveys, Rural health services.

This paper describes the recruiting and training of five classes of interviewers over a 20-month period, when baseline studies were conducted for the project. Following are the recommendations of the authors: (1) Course supervisors should be exposed to field conditions and should conduct household interviews in the same communities where trainees will be working. (2) Trainees should be held in a probationary status until their work is acceptable. (3) By increasing the amount of course time spent in the field, clearly defined instructional objectives for interviewing can be developed and feedback provided to the trainee of his progress toward becoming a skilled interviewer.

PB81-213530 PC A03/MF A01
Ghana Univ. Medical School, Accra.
Estimates of Indices of Fertility from Registration Data. Danfa Comprehensive Rural Health and Family Planning Project, Ghana
G. M. K. Kpedekpo, D. D. Nicholas, S. Otosu-Amaah, F. K. Wurapa, and D. W. Belcher. 1975, 49p MONO SER-3, AID-PN-AAH-258
Prepared in cooperation with California Univ., Los Angeles. School of Public Health.

Keywords: *Ghana, Fertility, Vital statistics, Demography, Rural areas, Estimates, Africa, *Health, *Population control, Statistical data, Family planning, Foreign technology.

This paper attempts to derive indices of fertility using data obtained from vital events registration and baseline demographic surveys conducted under the Danfa Rural Health project in Ghana. The project included a longitudinal study of approximately 50,000 rural inhabitants, 10-50 miles from Accra.

PB81-214397 PC A07/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Crops of the West African Semi-Arid Tropics
A. H. Kassam. Oct 76, 150p

Keywords: Semiarid land, Farm crops, Africa, Grain sorghum plants, Grain crops, Leguminous plants, Nuts(Fruits), Vegetable crops, Fiber crops, Tobacco plants, Cotton plants, Sugarcane, Oilseed crops, *Crops, *Plant diseases, Foreign technology, *West Africa.

This review deals with three aspects, i.e., ecology, cultivation, and diseases and pests, of 23 crops which are grown in the West African Semi-Arid Tropics. These crops form six groups: cereals, legumes, roots and tubers, vegetables, fibers, and other crops.

PB81-214405 PC A07/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Proceedings of the Consultants' Group Meetings on Downy Mildew and Ergot of Pearl Millet Held at Hyderabad, India on 1-3 October 1975
R. J. Williams. 1 Oct 75, 139p

Keywords: *Plant diseases, *Fungi, Meetings, India, Grain crops, Rye plants, Semiarid land, Tropical regions, Grain sorghum plants, Leguminous plants, Nuts(Fruits), Tolerances(Physiology), Moisture, Humidity, Soils, Rainfall, Yield, Plant genetics, *Grains(Food), Foreign technology, Claviceps, *Millets, Pulse crops.

ICRISAT, the International Crops Research Institute for the Semi-Arid Tropics, was created to serve a large segment of humanity which has been left behind in modern advances in the sciences of agricultural production. Pearl millet is the major crop able to withstand the moisture stresses so common on the sandier and less moisture retentive soils and of the drier areas of the semi-arid tropics. But their susceptibility to downy mildew and ergot, when they are grown on an extensive scale, have proven to be the major obstacle to the realization of the high hopes aroused by these more productive genotypes. The report describes the problem and progress on this vital problem.

PB81-214454 PC A08/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
Proceedings of the Consultants' Group Discussion on the Resistance to Soil-Borne Diseases of Legumes Held at Patancheru, India on 8-11 January 1979
Y. L. Nene, J. Kannaiyan, M. P. Haware, M. V. Reddy, and G. S. Purss. 8 Jan 79, 161p

Keywords: Semiarid land, Tolerances(Physiology), *Leguminous plants, *Plant diseases, India, Tropical regions, Soils, Control, Peas, Epidemiology, Fungi, Nuts(Fruits), Peanut plants, Selection, Greenhouses, Laboratories, Bean plants, Foreign technology, Pigeonpea, Chickpea, Rhizoctonia.

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has a mandate to improve three legumes--pigeonpea, chickpea, and groundnut--in the semi-arid tropical regions of Asia, Africa, and Central and South America. These legumes, like others, are affected by diseases; and those diseases caused by soil-borne pathogens are widespread and devastating. In order to review the present knowledge of some of the major diseases of pigeonpea and chickpea, with special emphasis on disease resistance, and to develop recommendations for research priorities leading to better disease control, ten leading scientists from several countries were invited for an in-depth discussion with ICRISAT staff in early 1979. The report discussed this research.

PB81-214488 PC A15/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
International Workshop on Grain Legumes Held at Hyderabad, India January 13-16, 1975
13 Jan 75, 333p

Keywords: Semiarid land, Grain crops, *Leguminous plants, Meetings, India, Agronomy, Symbiosis, Research projects, Plant genetics, Nutritive value, Breeding, Pollen, Tolerances(Physiology), *Grains(Food), Foreign technology, Pulse crops.

The report contains papers from the first International Workshop on Grain Legumes organized by International Crops Research Institute for the Semi-Arid Tropics. ICRISAT has a worldwide responsibility for research on the two grain legumes--pigeonpeas and chickpeas--which occupy the most important position in the diet of the people living in the semi-arid tropics.

PB81-214595 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Kenyan Low Cost Modular Timber Bridge
J. D. Parry. 1981, 41p

Keywords: Truss bridges, Wooden bridges, Structural design, Modular structures, Loads(Forces), Bridge decks, *Bridges, *Wooden structures, Construction joints, Construction costs, *Kenya, Foreign technology.

A novel design of a type of timber truss bridge that has been developed in Kenya is described. The bridge comprises a number of identical timber frames that are assembled into trusses of the required span. Two or more parallel trusses are supported on conventional abutments, and the timber deck rests on top of the trusses. Loading tests carried out on individual frames, on groups of frames, and on complete bridges, have indicated that the design is suitable for bridges ranging

in span from 12 m to 24 m required to carry limited numbers of vehicles up to 20t gross weight provided that the deck is accepted as contributing to the structural strength of the bridge. This assumption would not normally be made for bridges of this kind, but in practice measurements show that the deck does contribute significantly to the strength of the bridge. (Copyright (c) Crown Copyright 1981.)

PB81-215089 PC A03/MF A01
Tata Energy Research Inst., Bombay (India). Documentation Centre.
Solid Fuel Cooking Stoves: International Directory
Feb 81, 40p

Keywords: *Stoves, Directories, Kitchen equipment and supplies, Research projects, Foreign countries, Brazil, Canada, Federal Republic of Germany, Fiji Islands, Guatemala, India, Indonesia, Netherlands, Nepal, Sri Lanka, Switzerland, tanzania, United States, Zambia, Thermal efficiency, Optimization, Foreign technology, Listings, Energy efficiency.

Optimal design and promotion of the use of fuel efficient cooking stoves demand continued interaction and exchange of information between researchers, extension workers, policy makers and others concerned with stove projects. The directory is aimed at listing all the known organisations in this area.

PB81-215097 PC A12/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
A Guide to Sorghum Breeding
Leland R. House. 1980, 253p

Keywords: Semiarid land, Grain sorghum plants, Breeding, *India, Tropical regions, Fertilizers, Adaptation, Yield, Germination, Reproduction(Biology), Seeds, Plant growth, Plant genetics, Acclimatization, *Sorghum, Foreign technology.

Contents:
The sorghum plant:
Its basic uses, characteristics, and distribution;
The sorghum plant:
Growth stages and morphology;
Genetics;
Sorghum improvements:
Methods and procedures;
The seed industry:
Role organization, and development.

PB81-215113 PC A02/MF A01
Ahmedabad Textile Industry's Research Association (India).
Roof Cooling: An Aid to Textile Air-Conditioning
Research note
S. P. Patel, K. Subrahmanyam, N. Chandran, and J. J. Mistry. May 76, 16p Rept no. ENG/82

Keywords: Textile industry, Air conditioning, *Roof cooling systems, *India.

Two mills installed roof cooling two years ago and a few more during last summer. The system is working satisfactorily in all the mills. All the theoretically anticipated advantages have been born out in their actual experience. The temperature of the roof-top was found to be as high as 140F in summer afternoons because of radiation from the sun. Roof cooling lowers this temperature to about 90F. Roof cooling was installed in several mills, with substantial benefits. Ambient conditions improved in all the mills. The same degree of improvement could have been achieved if a humidification plant of adequate capacity were added to the existing one, but the plant could cost ten times as much as a roof cooling system and its running cost also would be about ten times as that of roof cooling.

PB81-216061 PC A06/MF A01
Colorado State Univ., Fort Collins. Engineering Research Center.
Evaluation and Improvement of Border Irrigation
Gideon Peri, Donald I. Norum, and Gaylord V. Skogerboe. Jul 79, 124p WATER MANAGEMENT-TR-49C, AID-PN-AAH-590
Grant AID/ta-C-1 1

Keywords: Developing countries, *Irrigation, Evaluation, Flooding, Improvement, Farms, Water distribution, Distribution systems, Field tests, Losses, Mathematical models, Flow charting, Open channel flow, Hydrodynamics, Fluid infiltration, Tables(Data), Developing country application, Border irrigation.

Border irrigation is a method of controlled surface flooding involving a rectangular field bounded by dikes along its longer dimension to restrict the lateral flow of water. This report is concerned with the evaluation and improvement of the graded border type in which there is a gentle and uniform slope in the direction of irrigation. Several different models are described, as are the processes for applying them.

PB81-216905 PC A08/MF A01
Toulouse-3 Univ. (France).
Autonomie Energetique de Villages de l'Inde, Modelisation du Bilan Demande-Ressources, Planification Optimale d'Une Production Unit. (Energy Self-sufficiency in Indian Villages, Model of Demand-Resource Balance Sheet, Mathematical Planning of Optimal Production Unit).
Doctoral thesis
Christine Tourrand-Brosset. 24 Jun 80, 175p Rept no. ORDER-692
Text in French.

Keywords: *India, Rural areas, Theses, Mathematical models, Foreign technology, *Energy, Renewable energy sources, Resource development, Energy consumption, Energy models.

The shortage of water and of wood for fuel is examined. Two solutions are considered--centralized production and local production--for the problem of supplying energy to the village. Local potentials, in all sources of renewable energy, are inventoried. An assessment is drawn up, showing the potential for local energy self-sufficiency based on use of renewable sources of energy within the village. A model of energy development and consumption was constructed for self-sufficiency in food and energy; ecology, technology, economics and sociology are taken into account.

PB81-216962 PC A24/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
International Workshop on Farming Systems Held at Hyderabad, India on November 18-21, 1974
R. W. Cummings, J. S. Kanwar, J. Kampen, D. Rijks, and A. Krishnan. 18 Nov 74, 557p

Keywords: Dry farming, Semiarid land, Arid land, Farm crops, Meetings, Soil conservation, *Water supply, Meteorological data, India, Harvesting, Australia, Water consumption, Seasonal variations, Cultivation, Africa, Wheat plants, Social welfare, Economic development, Developing countries, Livestock, *Fertilizers, *Farming, Foreign technology, Agroclimatology, Water harvesting.

Major subject headings of the Workshop are the following: Resource assessment and utilization of research for farming systems - land, water, climate, man; Crops and cropping patterns; Socio-Economic research in farming systems; Transfer of technology and off-site research.

PB81-217572 PC A03/MF A01
Ohio State Univ., Columbus.
Innovative Small Farmer Credit in Nicaragua
Ronald L. Tinnermeier, and Claudio Gonzalez-Vega. 1979, 33p AID-PN-AAH-360
Contract AID/ta-BMA-7
Prepared for the International Conference on Rural Finance Research Issues (2nd), Paper No. 15, held at Calgary, Canada, on August 29-31, 1979. Prepared in cooperation with Colorado State Univ., Fort Collins, and Costa Rica Univ., San Jose.

Keywords: Farms, Credit, Financing, *Nicaragua, *Banking, Finance, Cash flow, *Small businesses, Loans, Developing country application, Financial services.

This document reviews the innovative steps taken in Nicaragua by the Institute for Campesino Development (INVIERNO) to provide credit for low-income farmers. INVIERNO provides a set of integrated services directed towards local needs by dispatching teams composed of an agricultural technical (AGROMOC), an input and marketing specialist (CREDOMERC), and a community specialist, to the local Development Center (CEDE). Much of INVIERNO's success has been due to cutting loan costs. INVIERNO has coordinated its services with other agencies to expand its outreach.

PB81-217598 PC A02/MF A01
Ohio State Univ., Columbus.
Mobilization of Rural Savings: The Case of the Sudanese Savings Bank
Arnaldo Mauri, and Paolo Mottura. 1979, 24p AID-PN-AAH-356
Contract AID/ta-BMA-7
Prepared for the International Conference on Rural Finance Research Issues (2nd), Paper No. 11, held at Calgary, Canada, on August 29-31, 1979. Prepared in cooperation with Milan Univ. (Italy), and Parma Univ. (Italy).

Keywords: Savings, Banks(Buildings), *Sudan, Financing, *Banking, Cash flow, Credit, Finance, Management analysis, Demand deposit accounts, Loans, Developing country application, Financial services.

The Sudanese Savings Bank (SSB) was established in 1974 to promote Sudanese socioeconomic development. Various aspects of its institutional growth are discussed in this document. Overall SSB deposits have grown due to local government and Central Bank support, branch evening hours, trained and locally known staff, and rural location and lending policies.

PB81-219511 PC A03/MF A01
Southwest Georgia Area Planning and Development Commission, Camilla.
The Feasibility of a Honey Industry for the Lower Muscogee Creeks East of the Mississippi
May 81, 49p EDA-81-095
Contract EDA-04-06-01916

Keywords: American Indians, Economic development, Cost analysis, Employment, Investments, Production, Sales, Marketing, Income, *Honey industry, Industrial development, Creek Indians, Tax credits, Grady County(Georgia).

The report is a feasibility study on the operation of a honey industry by a tribe of American Indians known as the Lower Muscogee Creeks who reside in Grady County, Georgia.

PB81-220063 PC A07/MF A01
American Public Health Association, Washington, DC. International Health Programs.
Planning Pharmaceuticals for Primary Health Care: The Supply and Utilization of Drugs in the Third World
Monograph series no. 2
Oscar Gish, and Loretta Lee Feller. 1979, 149p*
AID-PN-AAH-595
Contract AID/ta-C-1320

Keywords: Developing countries, *Drugs, Licensing, Regulations, Purchasing, Distribution, Utilization, Foreign technology, Primary health care, Pharmaceuticals, *Health planning, Abuse.

The importance of the supply and use of pharmaceuticals for primary health care in LDCs has been relatively neglected in the general health literature. This monograph lessens this deficiency by analyzing supply conditions, procurement planning, and drug utilization systems in the Third World. This report also contains annexes concerning abuses in the patient licensing agreements and regulatory practices in selected countries; a list of essential drugs; a glossary of terms and a bibliography.

PB81-220071 PC A08/MF A01
University of South Florida, Tampa.
Individual, Family and Village Literacy in Development
Edgar G. Nesman, Thomas A. Rich, and Sarah E. Green. 31 Mar 80, 163 AID-PN-AAH-530
Contract AID/DSPE-C-0040

Keywords: Literacy, Developing countries, Rural areas, Farms, Behavior, Interpersonal relations, *Education, Developing country application.

Literacy has long been considered an important factor in promoting individual change toward more modern behavior. An individual's own literacy has traditionally

been the variable investigated--with conflicting results. It has been proposed by several authors that a clearer picture of the importance of literacy to individual behavior change in peasant societies may be gained by investigating the relationship between an individual's membership in a literate group (and the amount of literacy in the group) and his tendency to change his behavior in the direction of more modern practices. It is the purpose of the current study to explore the relationships between an individual's literacy, that of his family and village and his tendency to adopt modern farm practices.

PB81-220238 PC A03/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Patancheru (India).
Intercropping in Traditional Farming Systems
N. S. Jodha. 1979, 27p AID-PN-AAH-424
Grant AID/ta-G-1421

Keywords: Mixtures, Farm crops, *India, Rainfall, Sites, Planting, Soil properties, Mixing, *Farming, Grain sorghum plants, Seasonal variations, Tables(Data), Yield, Cotton plants, Developing country application, Vertisols, Castor bean plants.

Though largely neglected by researchers and planners, intercropping is a key element of traditional farming systems. Its superiority over sole cropping has been shown in terms of higher and dependable gross returns per hectare as well as per unit of peak period labor use. Its potential for greater employment is also revealed. Studies show that intercropping is largely a system of small and unirrigated farms.

PB81-220642 PC A03/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Some Dimensions of Traditional Farming in Semi-Arid Tropical India
Progress rept.
N. S. Jodha. Sep 79, 35p AID-PN-AAH-423
Grant AID/ta-G-1421

Keywords: *Arid land, *Farming, *India, Monsoons, Semiarid land, Land use, Seasonal variations, Soils, Cost effectiveness, Irrigation, Tropical regions, Developing country application, Vertisols.

This paper discusses some aspects of traditional farming systems in SAT areas of peninsular India. Results which are of direct relevance to the research strategy for generating new technology for SAT areas are discussed. This paper analyzes the rationale behind the practices of monsoon fallowing of deep Vertisols and intercropping in rainfed agriculture.

PB81-220659 PC A04/MF A01
California Univ., Davis.
Jobs for Women in Rural Industry and Services
Ruth B. Dixon. Jul 79, 60p AID-PN-AAH-490
Contract AID/otr-147-79-52

Keywords: Females, *Employment, Developing countries, Rural areas, Productivity, Income, *Women, Developing country application.

Increasing landlessness in combination with other economic and demographic forces has created a compelling need in most developing countries for the expansion of nonagricultural employment in rural areas. Because women tend to be particularly vulnerable to displacement from land and from tranditional income-generating activities by the commercialization of agriculture for cash crops and by investment in capital-intensive industries, policies of agrarian reform and rural development will need to design support systems to: raise the productivity of labor in which rural women currently engage; transform subsistence activities into income-generating activities; and create new employment opportunities for women, particularly outside of agriculture. This paper provides new statistics on female labor in 56 countries; and proposes strategies for mobilizing rural women for employment.

PB81-220865 PC A07/MF A01
American Public Health Association, Washington, DC. International Health Programs.
Training and Use of Auxiliary Health Workers: Lessons from Developing Countries
Doris M. Storms. 1979, 147p MONO SER-3, AID-PN-AAH-596
Contract AID/ta-C-1320

Keywords: Medical personnel, Developing countries, Specialized training, Public health, Recruiting, Health training, Developing country application, *Health manpower.

As the use of auxiliary health workers in expanding basic health services to LDC communities grows, data on effective program elements for particular settings need to be shared. This monograph draws upon contributions from knowledgeable auxiliary health workers in various LDCs and is designed for use by health planners as a practical sourcebook on ways to design, manage, and evaluate auxiliary based health services, and to plan, implement, and evaluate programs to recruit and train workers.

PB81-220873 PC A10/MF A01
Oregon State Univ., Corvallis.
Dryland Agriculture in Winter Precipitation Regions of the World: Status of the Technical Art
1979, 218p* AID-PN-AAH-329

Keywords: Semiarid land, *Arid land, *Deserts, *Agricultural economics, *Agriculture, Grain crops, Prices, Manpower, Farm crops, Dry farming, Winter, Livestock, Range grasses, Cultivation, Soil fertility, Tables(Data), Populations, Forage grasses, Developing country application, Small farms.

Drylands are more than exclusively cereal producing regions. Farmers grow both cereals and forage for livestock with the mix dependent upon relative prices and values of cereals and livestock, as well as cost and availability of production inputs. Relatively abundant and cheap labor may tilt the balance in favor of livestock production. Viewed in another way, technologies and crop rotations which assign importance to forage and livestock production may stand a better change of succeeding because they will employ more of the available resources than alternatives which concentrate on cereal production to the exclusion of livestock. Furthermore, combined operations can be expected to benefit smaller farms where labor tends to be most abundant.

PB81-221145 PC A04/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
Human Labor Use in Existing and Prospective Technologies of the Semi-Arid Tropics of Peninsular India
Progress rept.
R. D. Ghodake, James G. Ryan, and R. Sarin. Dec 78, 73p AID-PN-AAH-421
Grant AID/ta-G-1421

Keywords: Low income persons, *India, Developing countries, Technology transfer, *Employment, Manpower utilization, *Management techniques, Developing country application.

Labor is a key resource in the developing world in the semiarid tropical (SAT) regions, where more than 500 million poor eke out a living. The purpose of this study was to determine the effect of newly developed land, water, and crop management technologies on existing labor patterns in a SAT region, in this case peninsular India. The performing organization based its study on six villages, detailing the use of family and hired labor by 30 farmers in each village. Topics covered in this report include labor patterns and the size of the farm, composition of labor, seasonality of labor use, regional labor patterns, and labor patterns with the introduction of watershed-based technologies.

PB81-221152 PC A02/MF A01
Minnesota Univ., St. Paul. Dept. of Agricultural and Applied Economics.
Institutional Factors Affecting the Adoption of Agricultural Sector Analysis Methodology in LDC's
Staff paper
H. Klein, and T. Roe. Jul 78. 22p P78-10, AID-PN-AAH-506
Contract AID/ta-BMA-5

Keywords: Developing countries, *Agricultural economics, Economic analysis, Farm management, Tunisia, Government policies, Decision making, Developing country application.

Despite recent efforts to develop and apply agricultural sector analysis models in LDCs, data on the institutionalization of ASA techniques for policy making sectors remain lacking. The document discusses the issues and constraints regarding such institutionalization, as exemplified in the ASA model developed in Tunisia.

PB81-222101 PC A11/MF A01
Pacific Consultants, Washington, DC.
New Lands Productivity in Egypt: Technical and Economic Feasibility
L. F. Hesser, and E. Asmon. Jan 80, 235p AID-PN-AAH-511
Contract AID/NE-C-1645

Keywords: *Water supply, Land reclamation, *Agricultural economics, *Egypt, *Land use, Investments, Water resources, Yield, Farm crops, Cost analysis, Financing, Irrigation, Feasibility, Developing county application, Priorities.

Egypt has made heavy public investments in land reclamation during the past 25 years. The economic and social pressures that undergrid the emphasis on expanding the cultivated area are real and understandable. This reports states that a number of land reclamation opportunities with potentially attractive rates of return do exist if proper criteria is followed. Priority should be given to rehabilitating already reclaimed lands in areas where the required water lift is low.

PB81-222119 PC A16/MF A01
Pacific Consultants, Washington, DC.
New Lands Productivity in Egypt: Technical and Economic Feasibility. Crop Budgets and Farm Plans
Working paper no. 1.
Jan 80, 361p AID-PN-AAH-527
Contract AID/NE-C-1645

Keywords: *Egypt, Land reclamation, *Agricultural economics, *Deserts, Farm management, *Land use, Budgeting, Farm crops, Credit, Marketing, Financing, Exports, Research projects, Sociology, Prices, Arid land, Economic analysis, Developing country application.

Land reclamation has recently captured the interest of government officials in Egypt. Most new lands reclamation is being accomplished in desert regions. This report contains nine working papers which relate detailed backgrounds and descriptions of previously performed feasibility studies. Topics which are included in these working papers are: (1) crop budgets and farm plans; (2) sociological considerations, Tahaddi: a case study; (3) credit and input supply system; (4) marketing system; (5) prices; (6) perspectives for fresh produce exports; (7) agricultural research; (8) comparison of benefits of different agricultural projects; and (9) making technology the variable. A 21-item bibliography (1976-79) and a comparison of benefits of agricultural products is appended.

PB81-222432 PC A09/MF A01
Energy/Development International, Port Jefferson, NY.
The Contribution of Renewable Resources and Energy Conservation as Alternatives to Imported Oil in Developing Countries
Philip F. Palmedo, and Pamela Baldwin. 6 Feb 80, 188p AID-PN-AAH-389
Contract AID/SOD/PDC-C-0301

Keywords: Developing countries, Substitutes, Fuel substitution, Energy demand, *Energy conservation, Renewable energy sources, Developing country application, Biomass, *Solar energy, *Wind energy, *Hydroelectric power.

This report addresses the role of renewable energy sources and conservation in meeting the future energy demands of developing countries. It appears possible that renewable energy sources (biomass, solar, wind, small-scale hydro, and geothermal) could reduce that demand 8-15%.

PB81-222838 PC A03/MF A01
National Inst. for Water Research, Pretoria (South Africa).
How To Conduct an Industrial Waste Survey
G. Wentzel, and J. W. Funke. 1979, 50p

Keywords: *Industrial wastes, *Water pollution, *South Africa, Flow rate, Open channel flow, *Environmental surveys, Pipes(Tubes), Surveys, Industrial plants, Tables(Data), Flow measurement, Instructions, Flow Charting, Tables(Data), Foreign technology.

Methods to assess the water and effluent situation within a factory are described in the report. The measurement of flow in open channels and in pipes is explained. Tables are given for the evaluation of flow over V-notches, rectangular weirs and from open-ended pipes with free fall. Different sampling methods and the interpretation of analytical data are reviewed.

PB81-223307 PC A08/MF A01
Chicago Univ., IL.
The Impact of Family Planning Programs on Fertility Rates: A Case Study of Four Nations
Jay Teachman, Donald J. Bogue, Juan Londono, and Dennis Hogan. c1979, 164p AID-PN-AAH-476
Contract AID/pha-C-1108
Library of Congress catalog card no. 79-51147.

Keywords: Fertility, Family planning, Developing countries, *Birth control, Korea, Indonesia, Thailand, Indonesia, Columbia, Measurements, Statistical data, Foreign technology, Natality, Developing country application.

Documentation that family planning programs are capable of inducing major and rapid decline in fertility is still quite scarce. This monograph tests hypotheses linking family planning programs to changes in fertility by assembling data for four specific LDCs, Columbia, Thailand, Indonesia, and Korea.

PB81-223620 PC A10/MF A01
Colorado State Univ., Fort Collins. Engineering Research Center.
Evaluation and Improvement of Basin Irrigation
Technical rept.
Gideon Peri, Gaylord V. Skogerboe, and Donald I. Norum. Jun 79, 202p WATER MANAGEMENT-TR-49B, AID-PN-AAH-589
Contract AID/ta-C-1411

Keywords: Developing countries, *Irrigation, Improvement, Design criteria, Management, Performance evaluation, Mathematical models, Fluid infiltration, Developing country application.

A comprehensive definition and description of basin irrigation is given. A procedure is outlined for the design and evaluation of basin irrigation systems, showing the interactions between the various basin characteristics, the operational parameters, the management parameters, and the performance parameters. A general model is discussed by considering the various functions upon which it must be based (infiltration, advance, recession). A simple model for the determination of the infiltrated water distribution under basin irrigation is also presented.

PB81-224362 PC A09/MF A01
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Protein Recovery From Beef Packing Effluent
Final rept. 1977-81
John C. Ward, Walter Adams, and H. Chr. Isaksen. Jun 81, 176p* EPA/600/2-81/112
Grant EPA-S-804505
Prepared in cooperation with Sterling Colorado Beef Company, Sterling, CO. and Alwatech, Oslo, Norway.

Keywords: *Proteins, *Water pollution, Food packaging, Beef, *Industrial wastes, *Food processing, Materials recovery, Cost analysis, Biochemical oxygen demand, Operating costs, Capitalized costs.

The wastewater from a beef packing plant contained 4,600 mg/1 COD and 2,500 mg/1 of suspended solids. A physiochemical wastewater treatment process that recovers protein removed 80% of the oxygen demand and suspended solids, and 94% of the fat, oil, and grease. Total cost was $3 per 1,000 gallons (44% capital costs). About 2 pounds of protein were recovered per head. A price of 42 cents per pound of protein would pay all costs. The discharge of BOD was reduced to less than 3 pounds per head. For every pound of BOD entering the wastewater treatment plant, 0.77 pounds of product was recovered with a composition of 36% protein, 11% grease and oil, 27% inorganic solids, and 24% other solids (dry weight basis). This wastewater treatment process can be used as a pretreatment process for beef packing effluent prior to discharge to a conventional sewage treatment plant. A literature survey covering 7 different beef packing wastewater treatment processes was developed from 87 papers and reports. The cost figures given above were observed in a full scale plant and should not change significantly with different size wastewater treatment plants.

PB81-224479 PC E04/MF E04
Commission of the European Communities, Luxembourg.
The Utilization of Straw for Heating and Other Purposes
Final rept.
F. Moller. c1980, 95p Rept no. EUR-6935-EN
Customers in the European Community Countries should apply to the office for official publications of the European Communities, B. P. 1003, Luxembourg.

Keywords: Straw, Plant residues(Organic), Feeding stuffs, Animal nutrition, Heating, Paper products, Fiberboards, Paperboards, Utilization, *Agricultural wastes, *Fuels, Foreign technology, Energy sources.

Utilization of excess straw in Denmark was attempted by mulching; however, it had little effect on the humus content of the soil or on increased yield. Improving its feed value through removal of lignin by caustic soda or ammonia treatment doubled its feed value. Straw chipboard was produced having a bending strength and quality equivalent to that of wood chipboard. Straw added to beet silage absorbed the juices normally lost and so improved the feed value. Protein production from straw was attempted but many problems still need to be overcome. As a heating agent, 3-4kg of straw were found to be equivalent to 1 liter of oil, but work would be required on an automatic firing system, chimney size, etc. to make it completely viable as a fuel.

PB81-225419 PC A06/MF A01
MITRE Corp., McLean, VA.
Energy and Development: A Preliminary Analysis of Less Developed Countries
John G. Leigh, Wayne R. Park, and Ranvir K. Trehan. Jul 79, 118 Rept no. MTR-79WOO216
Contract AID/SOD/PCD-C-0146

Keywords: Developing countries, *Energy, Economic development, Imports, Inflation(Economics), Production, Energy consumption.

This report describes the results of quantitative analyses of the relationships between commercial energy production and consumption and economic and social development in Less-Developed Countries (LDC's). The questions examined include the relationship between energy consumption and economic growth; the impacts of energy cost increases on economic growth, balance of payments, and inflation; and the relationship between energy and social progress.

PB81-225450 PC A13/MF A01
MITRE Corp., McLean, VA. METREK Div.
Renewable Energy in Egypt: An Analysis of Options
Ranvir K. Trehan, James T. Connelly, Abdel H. El Sawy, John G. Leigh, and Edward G. Sharp. Jul 80, 287p Rept no. MTR-79WOO460

Keywords: *Egypt, *Solar energy, Wind power generation, Photovoltaic cells, Planning, *Wind energy, Renewable energy sources, *Energy source development, *Bioconversion.

This report contains an analysis of various renewable energy options from the standpoint of Egypt's energy needs and its social and economic development. The report presents recommendations for USAID assistance in renewable energy development.

PB81-227977 PC A03/MF A01
Syracuse Univ. Research Corp., NY.
Clean Fuels from Bioconversion of Solar Energy
Annual rept. 21 Jan 80-20 Jan 81
Scott D. Feighner, and Harish C. Sikka. Mar 81, 26p* GRI-80/0052
Contract GRI-5014-361-0265

Keywords: Biomass, *Algae, *Methane, Anaerobic processes, Fuels, Bacteria, Enzymes, Laboratory equipment, Carbon dioxide, Concentration(Composition), *Bioconversion, Glycolic acid, Chlorella pyrenoidosa, Chlamydomonas reinhardtii, Scenedesmus obliquus, Ankistrodesmus braunii.

The study seeks to enhance glycolic acid excretion by unicellular algae. The strains of algae selected to evaluate glycolic acid accumulation in culture medium were: Chlorella pyrenoidosa (UTEX 395), Chlamydomonas reinhardtii (UTEX 89), Scenedesmus obliquus (UTEX 393), and Ankistrodesmus braunii (UTEX 245). C. pyrenoidosa and C. reinhardtii, based on the amount of glycolic acid produced, were selected for further study. Initial experiments were conducted to measure the effect of different environmental growth conditions on the rate of glycolic accumulation in defined culture medium. The most pronounced effect on glycolic acid excretion was obtained by varying the concentration of carbon dioxide in air. At 1% CO_2 in air, C. pyrenoidosa accumulated 5.2 ppm glycolic acid in culture medium. Neither the pH of the culture medium nor the incubation temperature affected glycolic acid accumulation by growing C. pyrenoidosa cultures.

PB81-229262 PC A05/MF A01
Punjab Agricultural Univ., Ludhiana (India). Coll. of Agricultural Engineering.
Energy Balance and Utilization of Agricultural Waste on a Farm
Final rept.
B. S. Pathak, A. P. Bhatnagar, Daljit Singh, and K. S. Salariya. 1980, 90p
Sponsored in part by Tata Energy Research Inst., Bombay (India).

Keywords: Biomass, *Agricultural wastes, Farms, Utilization, *Fuels, Straw, Assessments, Farm crops, *India, Manure, Developing county application.

The report assesses the possibility of using crop residues and other agricultural works as a renewable energy source. Some conclusions drawn are: Energy requirements of tractor operated farms are only marginally higher than bullock operated farms; the use of commercial fuels for cooking in rural areas is very limited. Most crop residues except paddy straw is used for fodder or fuel. Farmers use dung as fuels although they know its use as a fertilizer. All energy required by farms could be self-generated. Paddy straw should be burned to produce electricity. References and other data are included.

PB81-230559 PC A05/MF A01
MITRE Corp., McLean, VA. METREK Div.
Potential for Energy Farming in the Dominican Republic: A Preliminary Analysis
Final rept. Feb-May 80
Ranvir K. Trehan, Lawrence Newman, and Wayne R. Park. May 80, 98p Rept no. MTR-80W105
Contract AID/SOD/PDC-C-0146
Sponsored in part by National Energy Policy Commission.

Keywords: Biomass, *Electric power, *Wood, Fuels, Assessments, Economic analysis, Design, *Dominican Republic, Biomass plantations, Biological energy conversion.

This report assesses the potential for generating electricity from dry forest energy farms in the Dominican Republic. In addition to a national assessment of dry forest energy potential, the report describes a conceptual Dominican Republic dry forest energy farm and conversion facility. The economics of this facility used to generate electricity are compared with those of oil-fired electric generation options. The report also contains a recommended plan for energy farm development in the Dominican Republic and indicates need for further analysis.

PB81-231011 PC A11/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Supplement to Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries
Final rept.

1981, 248p Rept no. CIR/BOSTID/38
Contract AID/ta-C-1433

Keywords: Developing countries, Rural areas, Photovoltaic cells, Solar heating, Biomass, Energy storage, Electric batteries, Stirling cycle engines, Inverters, Reviewing, Reviews, *Solar energy, *Wind energy, Renewable energy sources, Wind power, *Hydroelectric power, *Geothermal energy, Pedal power.

In 1976, the National Academy of Sciences published Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries, which presented information on a variety of subjects, including direct uses of solar energy (heating, cooling, distillation, crop drying, photovoltaics), indirect uses of solar energy (wind power, hydropower, photosynthesis, biomass), geothermal energy, and energy storage. This supplement includes information on new technologies developing during that period and on advances made in technologies described in the original volume. Like that volume, this report serves merely to direct the reader where to go for more information, and is not intended to be a 'how-to' manual or detailed catalog. Almost all of the subjects in the original book are discussed again and there are new discussions of pedal power and conditioning of electric power.

PB81-231540 PC A07/MF A01
MITRE Corp., McLean, VA. METREK Div.
Energy and Development in Central America. Volume I: Regional Assessment
Final rept. Oct 79-Feb 80
Wayne Park, Carole Neves, Ranvir Trehan, Eric Ackerman, and William Gallagher. Feb 80, 128p
Rept no. MTR-80W601
Contract AID/SOD/PDC-C-0146

Keywords: El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Foreign countries, Regional planning, *Energy source development, *Central America.

This report presents an energy assessment of six Central American countries - Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama - to assist these countries in defining, planning, and meeting energy requirements implicit in their economic and social development goals and also to assist the U.S. Agency for International Development and other development organizations in defining energy programs in Central America.

PB81-231557 PC A15/MF A01
MITRE Corp., McLean, VA. METREK Div.
Energy and Development in Central America. Volume II: Country Assessments
Final rept. Oct 79-Feb 80
Wayne Park, Carole Neves, Ranvir Trehan, Eric Ackerman, and William Gallagher. Mar 80, 350p
Rept no. MTR-80W602
Contract AID/SOD/PDC-C-0146

Keywords: El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Foreign countries, Regional planning, *Energy source development, *Central America.

This report presents an energy assessment of six Central American countries - Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama - to assist these countries in defining, planning, and meeting energy requirements implicit in their economic and social development goals and also to assist the U.S. Agency for International Development and other development organizations in defining energy programs in Central America.

PB81-232308 PC A02/MF A01
Punjab Agricultural Univ., Ludhiana (India). Coll. of Agricultural Engineering.
Studies on Sugarcane as an Energy Crop for Punjab
Final rept.
B. S. Pathak, A. P. Bhatnagar, Daljit Singh, and K. S. Salariya. 1980, 25p
Sponsored in part by Tata Energy Research Inst., Bombay (India). Documentation Centre.

Keywords: *Sugarcane, Biomass, Cost analysis, Sugar, India, Manufacturing, Design criteria, Process charting, *Fuels, Foreign technology, Alcohol fuels.

The report presents summaries and conclusions on the energy costs and returns in the production of sugarcane and its conversion to alcohol based on data collected from one sugar mill and one brewery in the State of Punjab.

PB81-232472 PC A02/MF A01
Municipal Environmental Research Lab., Edison, NJ. Storm and Combined Sewer Section.
Recycling Urban Stormwater for Profit
Journal article
Richard Field, and Chi-Yuan Fan. Jul 81, 6p Rept no. EPA-600/J-81-281

Keywords: Runoff, *Waste water reuse, Urban areas, Water conservation, Profits, Water consumption, *Water use, Water pollution, Water supply, Storm water runoff, Recycling.

Rainfall runoff becomes contaminated as it passes over urban land. Billions of gallons of water can be recovered for beneficial uses if urban stormwater is properly controlled and treated. The Storm and Combined Sewer Program of the United States Environmental Protection Agency Office of Research and Development has continuously supported the development and demonstration of stormwater control systems and treatment processes. Water quality of the treated storm runoff can meet the required standards for subpotable usage. Current urban stormwater control and treatment technology are discussed, leading to the feasibility of urban stormwater reuse for various purposes in industry, irrigation and recreation. A hypothetical case study illustrating the cost effectiveness of reclaiming urban stormwater for complete industrial supply is presented.

PB81-232902 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
A Comparison of Public Transport in Cities in South East Asia
D. J. Case, and J. C. R. Latchford. c1981, 34p Rept no. TRRL-SUPPLEMENTARY-659
Also pub. as ISSN-0305-1315. Prepared in cooperation with Mackay (Jamieson) and Partners Ltd., London (England).

Keywords: Urban transportation, Urban areas, Comparison, Operations, Services, *Southeast Asia, *Transportation, Foreign technology, Public transportation, Fare structures.

Information from eight cities in South East Asia has been compared to examine, mainly from the user's viewpoint, the characteristics of different public transport modes. Classification of the available public transport modes was made according to fare level and method of operation. As a result, a distinction is made between mass transit modes - defined as having fixed routes - and personalized public transport (PPT) modes. With few exceptions, mass transit modes have low fares and PPT modes have high fares. In only one city, Chiang Mai in Thailand, is there a PPT mode which is widely used and for which fare levels are similar to mass transit fares. (Copyright (c) Crown Copyright 1981.)

PB81-233611 PC A04/MF A01
Puerto Rico Univ., Mayaguez. Water Resources Research Inst.
Irrigation of Sugarcane Fields with Sewage Effluents in Southern Puerto Rico
Ning-Hsi Tang. Jun 79, 64p OWRT-A-049-PR(1)

Keywords: *Sewage treatment, *Irrigation, *Puerto Rico, Biochemical oxygen demand, Inorganic nitrates, Sugarcane, Climate, Salinity, Metals, Soil water, Sodium, Adsorption, Nitrogen, Leaching, *Sugarcane, Heavy metals, Sewage irrigation.

Primary and secondary sewage effluent and fresh groundwater were used to irrigate sugarcane fields in southern Puerto Rico. Because of a shortage of surface and groundwater, irrigation water production in this region is low and new sources of water are being urgently sought; it is estimated that production could be doubled if sufficient additional irrigation were available. Two sources of additional water used were the Ponce primary treatment plant effluent (10mgd), and the Fort Allen secondary treatment plant effluent. Ponce primary effluent was found to be generally good for sugarcane irrigation, comparing favorably with groundwater. Fort Allen secondary effluent was not suitable because of high salt content. Plots using sewage effluent were tested to determine their chemical state before and at the end of the study.

PB81-238073 PC A06/MF A01
Colorado State Univ., Fort Collins.
Soil Filtration of Sewage Effluent of a Rural Area
Final rept. Jun 77-Sep 80
B. R. Savey, K. A. Barbarick, and N. A. Evans. Aug 81, 115p EPA/600/2-81-151
Grant EPA-R-805401

Keywords: Fluid filtration, *Soils, Farm crops, *Irrigation, *Sewage treatment, Summer, Lagoons(Ponds), Operations, Ice, Rural areas, Soil water, Ground water, Elevation, Land use, Capitalized costs, Storage, Winter, Land application.

The treatment performance of irrigation using primary lagoon treated municipal sewage is compared to normal stream or ditch water irrigation when applied to mountain meadows and crops in a high altitude climate during summer months. The two irrigation waters are applied at different rates to plots that have both natural drainage and tile underdrains. A special winter operation is evaluated for applying primary lagoon treated municipal wastewater to ridge and furrow basins after they have been covered with an insulating sheet of ice and snow. Development of winter operations allow capital cost of constructing winter storage to be drastically reduced for small rural treatment facilities.

PB81-238297 PC A02/MF A01
Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
Solar Radiation as a Forest Management Tool: A Primer of Principles and Application
Forest Service general technical rept. (Final)
Howard G. Halverson, and James L. Smith. Apr 79, 19p* Rept no. FSGTR-PSW-33

Keywords: Solar radiation, *Forestry, Sun, Hydrology, Watersheds, Heat transfer, Shadows, Control, Heat transmission, Energy transfer, Equations, Seasonal variations, Exposure, Soil properties, Temperature, Evapotranspiration, Control, Plant growth, *Solar energy, Forest management, Forest watersheds, Pacific Northwestern Region(United States), Polar tilt.

Forests are products of solar radiation use. The sun also drives the hydrologic cycle on forested watersheds. Some basic concepts of climatology and solar radiation are summarized including earth-sun relations, polar tilt, solar energy, terrestrial energy, energy balance, and local energy. An example shows how these principles can be applied in resource management. This paper is designed to be used with an earlier report on controlling solar light and heat in a forest by managing shadow sources.

PB81-238966 PC A02/MF A01
Northeastern Forest Experiment Station, Broomall, PA.
Marketing Low-Grade Hardwoods for Furnitue Stock--A New Approach
Forest Service research paper (Final)
Hugh W. Reynolds, and Charles J. Gatchell. 1979, 12p Rept nos. NEFES/81-271, FSRP-NE-444

Keywords: Marketing, Hardwoods, Shortage, Furniture, Structural timber, Prices, *Wood, *Wood products, *Furniture.

A hardwood shortage of high-grade lumber exists while there is a surplus of low-grade hardwood timber. Two things are needed for the surplus to correct the shortage: a new manufacturing system and a new marketing technique. Utilization research at the Princeton Forestry Sciences Lab. has developed the new system for converting low grade hardwood into furniture. The manufacturing steps can be integrated with the existing marketing system from the timber grower to the logger to the sawmiller to the dimension maker to the furniture producer.

PB81-240087 PC A06/MF A01
United Nations Industrial Development Organization, Vienna (Austria). Industrial Information Section.
Directory of Industrial Information Services and Systems in Developing Countries
16 Feb 81, 125p* Rept no. UNIDO/IS.205

Keywords: Information centers, Developing countries, *Information services, Directories, Facilities, Industries.

Developing nations have come to recognize that industrial and technological information is a key element in accelerating the process of industrialization. In recent years, an increasing number of industrial and technological information centers have been established in developing countries. The types of services they perform and the subjects on which they provide information are varied. The aim of the present Directory is to make more widely known and to promote the full use of existing industrial and technological information facilities in the developing countries. Furthermore, as a contribution to the program of technical cooperation among developing countries (TCDC), it is intended as a networking instrument which should help those institutions interested in developing their own linkages at the national, regional and international level.

PB81-241432 PC A09/MF A01
Iowa State Univ., Ames. Engineering Research Inst.
The Conversion of Agricultural By-Products to Sugars
Final rept.
Peter J. Reilly. Mar 81, 200p ISU-ERI-AMES-81188, NSF/CPE-81008
Grant NSF-PFR77-00198

Keywords: *Agricultural wastes, Hydrolysis, Chemical composition, *Sugar, Temperature, pH, Enzymes, Purification, Xylanases, Xylosidase, Immobilized enzymes.

The following objectives were attained: (1) optimizing the immobilization of beta-xylosidase; (2) determining the effects of temperature and pH on the activity and stability of immobilized beta-xylosidase and comparing the results with those from soluble beta-xylosidase; and (3) preparing model substrates of known composition. A summary of what is known about the xylanase family is given, including results of this study. A comprehensive literature search of the catalytic properties of the glycoside glycohydrolase family, of which beta-xylosidase is a member, is presented. Results on the purification, immobilization, and characterization of beta-xylosidase are given. An overview of the purification of various xylanases is supplied. The purification and characterization of the five homogeneous xylanases purified in this study are detailed.

PB81-241994 PC A07/MF A01
Foras Forbartha, Dublin (Ireland).
Housing Needs Assessment: A Manual for Planners No. 5
Final rept.
J. M. Blackwell, and B. C. Murphy. Nov 79, 148p
Rept no. ISBN-906120-27-6

Keywords: *Housing, Demand(Economics), Estimates, Research, Planning, Ireland, Foreign technology.

This is the third manual in a series dealing with techniques for planners. The purpose of this manual is to describe how estimates of housing need might best be derived. Issues such as effective demand (based on ability to pay or social ambitions) or the allocation to the private or public sectors are not considered in the manual. It is hoped that the techniques described will be of assistance to professional and technical staffs and students concerned with the provision of housing.

PB81-243198 PC A06/MF A01
Economics and Statistics Service, Washington, DC. International Economics Div.
Survey of Irrigation in Eight Asian Nations: India, Pakistan, Indonesia, Thailand, Bangladesh, South Korea, Philippines, and Sri Lanka
Foreign agricultural economic rept.
William R. Gasser. Jul 81, 123p Rept no. FAER-165

Keywords: *Water supply, Developing countries, *Irrigation, Surveys, Area, Ground water, Investments, Surface waters, Production, *Asia.

Most good land in the eight Asian nations surveyed is cropped, so large production increases will likely come from more intensive cultivation made possible by irrigation. Extension of irrigated areas and better water management could double production in some areas of India, Pakistan, Indonesia, Thailand, Bangladesh, South Korea, Philippines, and Sri Lanka. But, large investments will be required. This report reviews the current state of irrigation, plus prospects and plans, in these countries.

PB81-244469 PC A03/MF A01
Ricardo Consulting Engineers Ltd., Shoreham-by-Sea (England).
The Utilisation of Alcohol in Light Duty Diesel Engines
Final rept.
28 May 81, 41p* DP-81/935, EPA/460/3-81/010

Keywords: *Diesel engines, Utilization, Methyl alcohol, Ethyl alcohol, Forecasting, Revisions, Design criteria, Performance evaluation, Fuels, Air pollution, Energy conservation, Foreign technology, Light duty vehicles, *Alcohols.

This report reviews the various approaches which can be employed to facilitate the utilization of alcohols - methanol and ethanol - in light duty diesel engines. The characteristic problems and the relative advantages of each approach are discussed. It is concluded that successful application to an engine of any of the available systems would require considerable development efforts. The choice of which system to employ is likely to be most heavily influenced by the proportion of alcohol substitution which is required and the resulting engine first cost penalty which is deemed to be acceptable. Alcohol utilization by more or less conventional spark ignited engines appears to be far less problematical than conversion of diesel engines.

PB81-245003 PC A07/MF A01
National Oceanic and Atmospheric Administration, Rockville, MD. Library and Information Services Div.
Impact of Weather and Climate on Agriculture: A Selected Bibliography
Gary H. Adams, Robert R. Walter, and Douglas A. Mcmanus. May 81, 132p* NOAA-81063001

Keywords: Operations, *Agricultural economics, Weather, Bibliographies, Economic impacts, Social effect, *Meteorology, Political objectives, Income, Farm crops, Plant diseases, Pest control, Mathematical models, Warning systems, Pasture, Fruit crops, Dairy cattle, Beef cattle, Animal diseases, Decision making.

This bibliography covers the impact of weather and climate on various socioeconomic and political sectors of modern society relating to agriculture. The literature on climatic impacts on agriculture is voluminous, and many of its subtopics had to be excluded such as aquaculture and fisheries; forestry, drought, desertification, and land use; water resources and hydrology; and man-induced weather modification. The references in this bibliography were retrieved by computer searching of about 30 bibliographic databases covering scientific, technical and social science topics. No form of literature has been excluded. Time coverage has generally been limited to 1970-1979.

PB81-246944 PC A08/MF A01
Tata Energy Research Inst., Bombay (India). Documentation Centre.
Water Pumping Windmill Designs: A Handbook
Tarangini Rastogi, and Narsing R. Rao. Jun 81, 162p

Keywords: Windmills, Structural design, Handbooks, Pumps, Water supply, Reciprocating pumps, Rotary pumps, Diaphragm pumps, *Water pumps, *India, *Wind energy, Foreign technology, Savonius rotors, Darrieus rotors, Developing country application, Vertical axis windmills.

This handbook covers 23 indigenous windmill designs that can be built locally with inexpensive and locally available material and skills. Three categories of windmill designs: horizontal axis, vertical axis and non-conventional type have been described and each design is supplied with following information: Name of the Designer, Institutional Affiliation, Type of Windmill, Specific Applications and Suitability, Design Features (Rotor Assembly, Sails/Blades, Power Transmission, Tower Structure, Tail Assembly, Pump, etc.), and Operating Data, as reported by the Designers. Most of those designs have been tested and are successfully being used in different parts of the world. Commercially obtainable windmills are also listed along with complete address of the manufacturers and relevant technical specifications. The introductory chapter describes types of windmills, their characteristics, and the different kinds of reciprocating and rotary pumps suitable for water pumping windmills. Annexure includes Glossary of useful windmill terms, Conversion Table, and Important Formulae for estimating power from wind.

PB81-247512 PC A05/MF A01
Transportation Research Board, Washington, DC.
Bus Planning and Operations
Walter Cherwony, Michael G. Ferreri, Robert M. Shanteau, Thomas H. Maze, and Snehamay Khasnabis. 1981, 80p* Rept no. TRB/TRR-798
Also pub. as ISSN-0361-1981.

Keywords: Urban transportation, *Buses(Vehicles), Travel time, *Transportation management, Garages, Automatic vehicle monitoring, Bus priority systems, Traffic lanes, Bus priority lanes, Driver education.

Contents: Bus sketch planning; Estimating the contribution of various factors to variations in bus passenger loads at a point; Proposed approach to determine optimal number, size, and location of bus garage additions; Practical methodology for determining dynamic changes in bus travel time; Development of an automatic-vehicle-monitoring simulation system; Analytic and simulation studies of factors that influence bus-signal-priority strategies; Transportation for the 1980 winter olympics--A retrospective look; Service-sensitive indicators for short-term bus-route planning; Houston's I-45 contraflow transit project; Evaluation of a contraflow arterial bus lane; Use and consequences of timed transfers on U.S. transit properties; Redesigning urban transit systems--A transit-center-based approach; and Driver selection and training in human service transportation programs.

PB81-247678 PC A11/MF A01
Barton-Aschman Associates, Inc., Minneapolis, MN.
Feasibility of Demand Incentives for Non-Motorized Travel
Final rept. Oct 76-Apr 80
Ferrol O. Robinson. Apr 81, 235p FHWA/RD-80/048
Contract DOT-OS-60183
Prepared in cooperation with Cambridge Systematics, Inc., MA.

Keywords: Travel, Incentives(Psychology), *Bicycles, Motivation, Attitudes, Surveys, Walking.

The report examines the potential of various strategies for increasing the use of walking and bicycling for utilitarian purposes. The analysis is based on extensive attitudinal surveys conducted in five locations across the U.S. Perception models are developed to identify underlying consumer perception of the transportation services offered by walking, bicycling, auto and transit. Subsequently, preference models are developed to identify the relative importance of each underlying dimension. Consumers' preferences are compared to their actual choice. Costs and benefits of improving the infrastructure for walking and bicycling are identified, and a methodology for their estimation is presented.

PB81-248056 PC A04/MF A01
Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
International Directory of Documentation Services Concerning Forestry and Forest Products
Forest Service general technical rept. (Final)
Peter A. Evans, and Gary L. Skupa. Apr 81, 75p*
Rept no. FSGTR-PSW-47

Keywords: *Wood products, *Forestry, Directories, Documentation, Cost analysis, Subject indexing, Indexes(Documentation), Biodeterioration, Wood, Paper industry, Abstracts, Magnetic tapes, Agriculture, Brazil, Pesticides, Forest industries.

This directory lists 120 documentation services concerned with forestry, forest products, or related fields in 28 countries. The entry for each service includes title of service, cost, publisher, subject coverage, formatting data, input source, indexing and data-handling methods, and availability of special services other than the primary ones of indexing and abstracting.

PB81-249252 PC A03/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Harvesting Wood for Energy
Forest Service research paper

Rodger A. Arola, and Edwin S. Miyata. Apr 80, 29p* Rept no. FSRP-NC-200

Keywords: *Wood, *Fuels, Harvesting, Hardwoods, Cutting, Wooden logs, Recovery, Forest trees, Machinery, Wood wastes, Sawmills, Cost analysis, Equipment, Productivity, Thinning, Energy production.

There is a lack in the literature of well documented information on the costs and productivity of timber harvesting with various types of commercial logging equipment. Since each logging operation is different, each must be analyzed independently, taking into account the equipment used, the stand conditions, and other considerations. The objective of this paper is to present pertinent cost and productivity data for several harvesting operations. These operations were not all conducted to provide wood fuel, but the information is still of value to those considering the harvest of wood for energy.

PB81-249484 PC A02/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Logging System Cost Analysis: Comparison of Methods Used
Forest Service research paper
Edwin S. Miyata, and Helmuth M. Steinhilb. 1981, 19p Rept no. FSRP-NC-208

Keywords: Cost analysis, Wooden logs, Lumbering, Fixed costs, Equipment, Systems analysis, *Wood, *Forestry, Insurance, Scheduling, Taxes, Equations, Operating costs, Tables(Data), Management, Forest management.

Several methods of calculating machine rates, costs, and productivity for both single pieces of logging equipment and for logging systems are discussed in the report.

PB81-249690 PC A03/MF A01
Consumer Dynamics, Inc., Rockville, MD.
Vocational Education Training in Environmental Health Sciences: Collecting Stream Samples for Water Quality, Module 16
Fredric C. May. Jul 81, 43p DE/OVAE-80-0088-16 Contract OE-300-80-0088

Keywords: Handbooks, Sampling, Streams, Laboratory equipment, Sites, pH, Guidelines, *Environmental surveys, *Water quality, *Water pollution, Procedures.

In this instructional module, students learn to collect stream samples for specific laboratory analyses. Training Prerequisites: Before beginning this module, students must know how to work safely in a laboratory; adjust the pH of a solution to a given value, using an acid or a base; use a graduated Mohr pipet to deliver amounts of liquid accurate to 0.01 ml; read a Centigrade thermometer accurate to the nearest degree; and sterilize equipment using dry heat or an autoclave. Objectives. Upon completion of this module, students will be able to perform the following function: Use a job aid to identify all the equipment and reagents needed to collect stream samples for water quality analyses, clean and prepare sampling bottles needed for collecting stream samples for water quality analyses, and select the most suitable location for collecting water samples at a predesignated sampling site at a stream and take a grab sample.

PB82-101486 PC A06/MF A01
Economic Research Service, Washington, DC. International Economics Div.
World Food Aid Needs and Availabilities, 1981
Foreign agricultural economics rept.
Linda Beeler, Connie Byledbal, Bill Coyle, Mike Cullen, and Liz Davis. Aug 81, 121p* Rept no. FAER-168

Keywords: *Food supply, *International trade, Developing countries, Asia, Africa, Latin America, Agricultural products, Grains(Food), Farm crops, Grain crops, Production, Availability, Surveys, Middle East.

Low income countries are likely to need more food aid in 1981-82 despite the record crops harvested in 1980-81 and early-season indications of another good harvest in 1981-82. The food aid available from the major donor countries in 1981-82 is likely to be the largest in three years, but will still be well below both aid needs and the donation levels of the early and midseventies.

PB82-105768 PC A12/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Some Facets of Child Development
Oct 79, 267p

Keywords: *Children, Personnel development, *India, Social services, Populations, Public health, Nutrition, Education.

The present publication consists of monographs written on different facets of child development with a perspective on the Indian child. The monographs have been prepared by a group of young social scientists who are neither child psychologists nor child development specialists per se, but who have nevertheless tried to review the available researches in the field to identify gaps in knowledge. The monographs have been organized under three sections viz: (1) Population, Health and Nutrition; (2) Socio-Psychological Development; (3) Related Issues and Problems.

PB82-105834 PC A04/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Residential Programmes for Destitute Children. Part I: Organisation and Administration
Guide book
V. M. Kulkarni. Mar 79, 52p

Keywords: *Children, *India, *Housing, Disadvantaged groups, Urban areas, Rural areas.

The report describes the need for resident care for needy children of all types. It suggests a nationwide program and details organization of individual programs.

PB82-105842 PC A13/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Working Children in Bombay: A Study
Musafir Singh, V. D. Kaura, and S. A. Khan. 1980, 297p

Keywords: *Children, *Employment, Foreign countries, *India, Central city, Surveys, Blighted areas, Exploitation.

The study defines and identifies working children and seeks to highlight their problems within a perspective on the basis of a selected sample of 300. It portrays the various facets of their work life and uncovers the socio-economic factors embedded in the family situation which compel children to join the labor force. The study also discusses relevant legislation and points out the bottlenecks in their effective implementation. In the end, it suggests an action strategy aimed at mitigating the unhealthy and undesirable aspects of child labor.

PB82-105859 PC A18/MF A01
Central Inst. of Research and Training in Public Cooperation, New Delhi (India).
Famine Relief in Bihar: A Study
1967, 421p

Keywords: *Food supply, *India, Distribution systems, Coordination, Management analysis, Sociology, Bihar(India), Famine, Volunteer programs.

This is a sociological study of the recent Bihar Famine and of the organization and operation of relief. Though one chapter in this study deals with relief measures organized by the state government, it is mainly devoted to the study of the work of the voluntary bodies, national and international.

PB82-105941 PC A05/MF A01
Ministry of Social Welfare, New Delhi (India).
Report of the Working Group on Production and Marketing of Infant Foods
Apr 81, 93

Keywords: *Food processing, *India, Standards, Marketing, *Food products, Foreign technology, Infant foods, Baby foods.

Contents: Introduction and backdrop of international initiative; Working group on production and marketing of infant foods; Code of conduct for production and marketing of infant foods and feeding bottles in India; and Follow up action and supportive measures.

PB82-106857 PC A03/MF A01
Ranganathan (Shankar) (India).
The Economics of Forestry
Shankar Ranganathan. Dec 80, 49p
Paper presented at an all India seminar on 'Nature Protection and Modern Society,' Bombay, November 20-21, 1980.

Keywords: Economic analysis, *Forestry, *India, Fuels, Employment, Wood products, Benefit cost analysis, Foreign technology.

The report discusses the general concerns of costs and management of forests in India. The introduction of modern management methods with education, could provide the existing feudal structure with employment opportunities and increase the cost and benefits of wood production.

PB82-106865 PC A06/MF A01
Central Inst. of Research and Training in Public Cooperation, New Delhi (India).
People's Participation in Adult Education: Report of the National Seminar, January 4-8, 1971
1971, 115p
Prepared in cooperation with Indian Adult Education Association.

Keywords: *Education, Adults, *India, Meetings, Literacy, National government, Foreign countries, Citizen participation, Females, Attitudes, Instructors, Students, Requirements.

Illiteracy and ignorance are at the root of many a problem relating to change and development in India. In a developing country like India, with constraints of financial resources and technical manpower, coordinated and organized efforts on the part of the government and the voluntary bodies over a period of a decade or more alone can make a dent on the problem of mass illiteracy. Primary education and adult education are two core sectors in the field of education, which deserve our immediate attention. Prevention of massive drop-outs and expansion of educational facilities to all children at the primary level, are necessary for enabling the present generation to grow up as educated adults. But a nation cannot afford to wait for a generation to see its children get educated so as to participate in the process of change and development. The adults of today must therefore be simultaneously educated through programmes of adult education. The latest scheme of the Government to launch Pilot Projects in 30 educationally and economically backward districts of India with a view to eradicating illiteracy completely from these areas in a period of five years is a laudable experiment. The setting up of a National Board of Adult Education, and similar Boards in all the States, will help in giving the necessary guidance and ensure effective coordination between offical and non-official agencies.

PB82-107111 PC A08/MF A01
National Buildings Organisation, New Delhi (India).
Consultation: Lime-Pozzolana, New Delhi - 8th-9th December, 1977; Papers and Proceedings
Dec 77, 172p
Prepared in cooperation with Lime Manufacturers Association of India, and Central Building Research Inst., Roorkee.

Keywords: Buildings, Construction materials, Meetings, Pozzolans, Calcium oxides, Mortars(Material), Fly ash, Manufacturing, Kilns, *Building materials, Foreign technology.

During the course of discussions held over two days on the papers presented at the meeting, many suggestions/criticisms emerged. The consensus of the meeting was that the decisions and the necessary corrective steps to more completely use these two natural resources available to the building program in the country and to make available a standard Lime and standard Pozzolana for Building Construction, should be recorded, and a Standing Committee be formed to implement the decisions to their logical conclusions.

PB82-107129 PC A03/MF A01
National Buildings Organisation, New Delhi (India).

A Compendium of New Construction Techniques and Materials
1980, 41p

Keywords: Construction materials, Construction management, Foundations, Walls, Doors, Windows, Floors, Roofs, Precast concrete, Masonry, Structural design, Buildings, *Building materials, Foreign technology.

A number of new construction techniques incorporated in NBO Experimental Housing Projects are now being adopted by various construction agencies in the country resulting in appreciable reduction in the cost of construction as well as savings in scarce materials like cement and steel. These include single brick thick load bearing walls for up to 5 storied residential buildings, under-reamed pile foundation, precast RCC roofing system, precast lintels, etc. In this compendium brief details of these new construction techniques and materials have been compiled to propagate their adoption in practice by construction agencies.

PB82-107384 PC A07/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Special Nutrition Programme in Delhi: A De Novo Evaluation Study
Nagendra Nath, Usha Abrol, Kalyani Roy, and Mridula Sharma. Dec 79, 138p

Keywords: *Nutrition, *India, *Health, Foreign technology, Delhi(India), Child health care, Maternal health care.

A number of nutrition intervention programs have been launched in the country to combat the wide-spread malnutrition among the vulnerable sections of society, specially the children and expectant and nursing mothers. Of these, Special Nutrition Program, launched with the object of providing supplementary nutrition to preschool children below 6 years of age, expectant and nursing mothers in urban slums, tribal areas and drought-prone areas has emerged as an important program in terms of target group coverage and budgetary allocations. The successful implementation of the scheme is contingent upon several functional variables like judicious selection of the target group, effective delivery system, proper utilization of services, adequate community participation and close supervision and monitoring. These factors should be consistently supported by community education about the need, objective, services, etc. of this important program.

PB82-107699 PC A07/MF A01
Central Inst. of Research and Training in Public Cooperation, New Delhi (India).
Famine Relief and Reconstruction: Report of the Workshop, January 12-16, 1971
1971, 149p

Keywords: *Food supply, *India, Distribution systems, Coordination, Supervision, Management analysis, Famine, Volunteer programs.

The report should be of value to those in the government and the voluntary organizations who plan and streamline the famine relief operations.

PB82-107707 PC A09/MF A01
Central Inst. of Research and Training in Public Cooperation, New Delhi (India).
On Getting People to Participate: Seven Case Studies
S. R. Ramdev, N. V. Lalitha, V. D. Kaura, and R. M. Varma. Feb 71, 177p

Keywords: *Social services, *India, Citizen participation, Organizations, Children, Females, Disadvantaged groups.

The need for people's participation in programs of national development is a widely accepted fact in a democratic society. This presentation is based on seven case studies of voluntary agencies which were conducted by four members of the Institute's faculty at different times between 1968 and 1970. Besides describing the activities and organizational aspects of each agency, an attempt has been made to analyze the factors which promoted or hindered the process of people's participation in agency's programs and development. An overall analysis based on all the seven cases has also been made to highlight the correlation between the features of these agencies and the nature and extent of people's participation received.

PB82-107731 PC A05/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
A Guidebook for Anganwadi Workers
1981, 77p

Keywords: Manuals, Nutrition, *India, Foreign countries, *Health care delivery, *Children, *Women, Foreign technology, Health care, *Health education, Child health care.

The Integrated Child Development Services Scheme is designed to provide to children in the age group 0-6, pregnant and lactating mothers, supplementary nutrition, immunization, health check-up, referral services, nutrition and health education and non-formal preschool education. These services are supplemented with functional literacy to women under the Scheme of Functional Literacy for Adult Women. It is presumed that this package of services would prove more beneficial to the recipients, than offering them through varied channels in an unintegrated manner. The Scheme has been launched in selected rural community development blocks, tribal development blocks and urban slums.

PB82-107749 PC A06/MF A01
Central Inst. of Research and Training in Public Cooperation, New Delhi (India).
Population Education of Parents Through Parent Teacher Associations: Report of the National Seminar, November 23-26, 1971
1971, 111p
Prepared in cooperation with National Parent Teacher Association of India.

Keywords: Population growth, *India, *Education, Birth control, Meetings, Parent child relations, Instructors, *Population control.

The Central Institute of Research and Training in Public Cooperation organized a National Seminar in collaboration with the National Parent Teacher Association of India on Population Education of Parents through Parent Teacher Association from November 23 to 26, 1971. The main objective of the Seminar was to discuss and formulate the contents of population education, a syllabus for the training of field workers, the methods of educating the parents, the organizational machinery needed for implementing the scheme and the ways of mobilizing resources for the same.

PB82-107756 PC A05/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Vocational Training in Residential Institutions. Part II: Vocational Training
Guide book
T. Prasad. Mar 79, 89p

Keywords: *Children, *Vocational guidance, Specialized training, Handicapped persons, Foreign countries, *India, National government, Government policies, *Rehabilitation.

The report advocates updating and instituting vocational training in orphanages and homes for handicapped children. The training should have relevance for the child's future in self-support and dignity.

PB82-107764 PC A07/MF A01
National Inst. of Public Cooperation and Child Development, New Delhi (India).
Working Mother and Early Childhood Education
1978, 128p
Sponsored in part by United Nations Educational, Scientific and Cultural Organization, New York.

Keywords: Females, *Employment, *Children, Day care centers, *India, Parent child relations, Socioeconomic status, Attitudes, Urban areas, Rural areas, *Education, *Women.

This study is one of a series of national studies funded by UNESCO as a part of its program to promote the status of women and their participation in national development programs. The aim of these studies is to gather specific information on how and to what extent working mothers are able to provide early childhood education to their children and in doing so how they seek to meet their dual obligations as mothers and as workers outside the home. India was selected as one of the five countries where the study was conducted. The National Institute of Public Cooperation and Child Development was called upon to undertake the responsibility of conducting the study.

PB82-107772 PC A03/MF A01
Ranganathan (Shankar) (India).
Ecological Planning for Prosperity
Shankar Ranganathan. Nov 80, 33p
Keynote address on 'Economics of Wildlife Resources' delivered on July 9, 1980 at Workshop/Meeting on Wildlife Resources in Rural Development.

Keywords: *Ecology, Economic development, Recreation, Wildlife, Animals, Investments, *India, *Employment, Foreign technology.

The report is a keynote address on 'Economics of Wildlife Resources' at a meeting on 'Wildlife Resources in Rural Development, in July 1980 at the University of Hyderabad. The general subjects discussed were wildlife and recreation to promote employment in India, and game farming.

PB82-108911 PC A02/MF A01
National Buildings Organisation, New Delhi (India).
Durable Bamboo House
Sep 80, 15p Rept no. ROOF OVER YOUR HEAD-3

Keywords: *Houses, Rural areas, *Bamboo, Construction, Developing countries.

The booklet contains information on treatment of bamboo - materials and cost - on how to build a bamboo house and on bamboo matting.

PB82-108929 PC A02/MF A01
National Buildings Organisation, New Delhi (India).
Hard Boards
1968, 16p Rept no. TECHNICAL INFORMATION SER-29

Keywords: *Fiberboard, Construction materials, *Wood products, Manufacturing, Houses, Foreign technology.

Contents: Types of hardboards and applications; Raw materials; Manufacture; Properties; Fixing of hardboard; Advantages; and Prices.

PB82-108937 PC A02/MF A01
National Buildings Organisation, New Delhi (India).
Low Cost Brick House
Nov 80, 15p Rept no. ROOF OVER YOUR HEAD-2

Keywords: *Houses, Rural areas, *Bricks, Clays, Construction, Instructional materials, Developing countries.

Use of burnt clay bricks is very commonly made for construction of pucca houses. Brick masonry walls of both load-bearing and non-load-bearing types are constructed. In many parts of India reinforced brick roof arch or vault roof is also made. Use of bricks is also made for paving the floors, construction of jallies and lintels over windows and doors. A view of a demonstration low cost rural house put up by the NBO Regional Rural Housing Wing, Bangalore. The plinth area of the house is 26 sq m having one room, kitchen, bathroom and veranda. The cost of the house is Rs. 4,580. Burnt bricks have been used in construction of walls and Mangalore tile roofing over jungle wood rafters has been adopted.

PB82-108945 PC A02/MF A01
National Buildings Organisation, New Delhi (India).
Making Mud Houses More Durable
Mar 80, 18p Rept no. HOUSING FOR MILLIONS SER-1

Keywords: *Houses, Rural areas, Mud, Fire resistant coatings, Bitumens, Roofs, Construction, Developing countries, *Adobe.

To provide technical advice and information to the common man for building houses at low cost a series

of popular booklets 'Housing for Millions' is being brought out for wide circulation. The material is based on a series of articles on low cost housing. This booklet contains information on water proofing treatment for mud walls, and fire retardant and water repellent treatment of thatch.

PB82-108952 PC A02/MF A01
National Buildings Organisation, New Delhi (India).
Building Foundations. Part I: Site Investigation
Dinesh Mohan, and G. S. Jain. 1961, 15p Rept no. TECHNICAL INFORMATION SER-5(A)

Keywords: *Buildings, Foundations, Site surveys, Soil surveys, Soil analysis, Soil properties, Field tests, Seasonal variations, *Site selection, Foreign technology.

The object of site investigation is to get information regarding the nature, thickness and variation of soil strata; physical properties of the soil strata; and seasonal variation in the ground water level. This information is useful for the design of safe and economical foundations and for the design of other structures in soil such as embankments, cuttings, etc. Such information also helps in the final location of the structure and in the selection of suitable materials for construction. In the case of existing works it helps in attributing the causes of failure and in formulating steps to be taken for further safety.

PB82-108960 PC A03/MF A01
National Buildings Organisation, New Delhi (India).
Research Report on Nail-Joints in Timber Structures. Part III
N. J. Masani, K. S. Pruthi, Sundar Lal, and Bhagirath Prasad. Apr 71, 46p Rept no. TECHNICAL/RR-26

Keywords: *Wooden structures, Construction joints, Nails(Fasteners), Design, Structural timber, *Houses, Foreign technology.

Nail joints are suitable for use in light and medium structures like roof trusses, beams and columns. Traditional carpentry joints in such structures normally make use of heavy steel gusset plates, jibs and cotters and they call for employment of skilled carpenters. In nail joints these fastening devices are dispensed with and in their place, ordinary wire nails are utilized. The jointing method is also very simple and does not need skilled workmen. The Forest Research Institute has obtained data on the behavior of nail joints through a number of tests on primary as well as secondary species of timber. Various factors that affect the strength of nail joints, like, the type of nails, pre-bores and the direction of application of load with respect to the grains, have been taken into account. The findings of the research work are presented in this report. It is hoped that the information in this publication will promote increased adoption of nail jointed construction for effecting economies. The publication also serves the cause of secondary timbers by making available reliable research data, which is an essential pre-requisite for their acceptance.

PB82-111410 PC A05/MF A01
Institute of Hydrology, Wallingford (England).
A Regional Analysis of River Floods and Low Flows in Malawi
R. S. Drayton, C. H. R. Kidd, A. N. Mandeville, and J. B. Miller. Jul 80, 89p Rept no. 72
Also pub. as Malawi Water Resources Div., Lilongwe rept. no. TP-8.

Keywords: Flood forecasting, Stream flow, Civil engineering, *Malawi, *Floods, Mathematical models, Regression analysis, Design criteria, Intake systems, *Irrigation, Embankments, Slope, Maps, Flow frequency, Low flow.

River flow data for Malawi have been examined in a regional analysis to provide methods of estimating floods and low flows for engineering and agricultural applications. Floods for 28 stations have been analyzed to produce (a) a regression model for the Mean Annual Flood on catchment characteristics and (b) a regional flood frequency curve. An archive of daily flows for 53 stations was used to produce estimation methods for (a) the average daily flow, (b) the flow duration curve, (c) the low flow frequency curve, (d) storage-yield analysis, and (e) recession forecasting.

PB82-111915 PC A05/MF A01
Instituto Nacional de Tecnologia Industrial, Buenos Aires (Argentina).
Algo Sobre Pequena y Mediana Empresa. (On Small and Medium Enterprises).
Jorge Alberto Samitier. 1979, 97p
Text in Spanish.

Keywords: Economic development, Businesses, Financing, *Technical assistance, Government policies, *Argentina, *Small businesses.

The report sets forth a conceptual framework for academic and governmental efforts at understanding and assisting economic development in the sector of small and medium-sized enterprises. Different types of aid to businesses are discussed, from financial assistance and governmental intervention to individual and technical information assistance. The importance of small businesses, which often make up 90% or more of a country's total businesses, is emphasized, and information on how they are formed is presented. A bibliography of reports done on small and medium size industries is included.

PB82-112137 PC A03/MF A01
Institute of Hydrology, Wallingford (England).
Soil Physical Processes of Groundwater Recharge through Indian Black Cotton Soils
Apr 81, 40p Rept no. 77

Keywords: Soil water, Ground water recharge, Cotton plants, Runoff, Water flow, *Soils, *Ground water, *Hydrology, Tensiometers, Evaporation, Hydraulic conductivity, Moisture content, Droughts, Clay soils, Silts, Basalt, *India, Foreign technology

Soil physical studies were carried out in the black cotton soil areas of the Betwa Basin, Central India, to assess their role in partitioning monsoon rainfall into runoff and groundwater recharge. The regional and annual variations of soil moisture were studied first, followed by studies of the soil water flow mechanisms at representative sites. The studies suggested that significant recharge is possible only in the shallow soil areas, where structured clay/silts directly overlie the weathered basalt surface aquifer.

PB82-113002 PC A04/MF A01
International Crops Research Inst. for the Semi-Arid Tropics, Hyderabad (India).
The Millets: Importance, Utilization and Outlook
K. O. Rachie. 1975, 73p

Keywords: Grasses, Grain crops, Agricultural economics, Taxonomy, History, Acclimatization, Proteins, Vitamins, Nutritive value, Production, *Grains (Food), *Millets, Pear millet.

Contents:
History and geographic adaptation;
World production of millets;
Utilization of millets;
Outlook for millets.

PB82-113010 PC A02/MF A01
Metallurgical and Engineering Consultants (India) Ltd., Ranchi.
India's Energy Needs and Areas of International Cooperation
S. N. Wazir. 1980, 25p
Presented in the Chem and Tech '80 Congress at Bombay in March, 1980.

Keywords: *India, International relations, Developing countries, Foreign countries, *Energy source development, Energy sources, Energy consumption.

Discusses India's energy sources and consumption and areas of international cooperation necessary for energy source development.

PB82-113309 PC A05/MF A01
Eastern Oregon Community Development Council, La Grande.
Solar Hot Water Heater
Joe Garlitz, Dallas Hoopes, Lyle Berry, Jan Corey, and Rich Huggins. May 77, 79p
Sponsored in part by Oregon Dept. of Human Resources, Salem. Errata sheet inserted.

Keywords: Manuals, Hot water heating, Construction, Fabrication, Installing, *Solar water heating, Maintenance, Solar water heaters, Developing country application.

This booklet contains complete step-by-step instructions on how to build your own solar hot water heater for around $300. The heater can be easily constructed from materials generally available at a hardware store. The heater can also be used as an auxiliary heater to an existing heating system. Background, theory, codes and permits, materials, tools, construction, installation, and maintenance are all covered in detail along with alternate systems.

PB82-113572 PC A05/MF A01
National Council for Scientific Research, Lusaka (Zambia).
Directory of Scientific Organisations in Zambia
1975, 80p

Keywords: Research projects, Directories, *Zambia, National government, *Research and development, *Scientific societies, Foreign countries, Organizations, Developing country application.

The directory contains a complete listing of government research organizations in Zambia. Ministries covered include: Commerce; Health; Home Affairs; Lands, Natural Resources and Tourism; Mines and Industry; Power, Transport, and Works; Rural Development; University of Zambia; and the National Council for Scientific Research.

PB82-113580 PC A02/MF A01
National Council for Scientific Research, Lusaka (Zambia).
The Effect of Form and Orientation on the Radiant Solar Heat Load on Buildings under Zambian Conditions
B. A. Gouveia. Apr 70, 14p Rept no. NCSR/TR-6

Keywords: *Buildings, *Solar heating systems, Meteorological data, Seasonal variations, Solar radiation, Design criteria, *Zambia, Foreign technology, Developing country application.

The solar load on a building is related to the geographic location of the building, i.e., latitude, altitude, climate, etc., the form of the building, the orientation of the building and the surface details of the building. This study takes into account the first three variables, i.e., geography, form, and orientation, and attempts to provide a comparative tool for design decisions and a specification for detailed design.

PB82-113614 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Selection of Geometric Design Standards for Rural Roads in Developing Countries
R. Robinson. c1981, 19p Rept no. TRRL-SUPPLEMENTARY-670
Also pub. as ISSN-0305-1315.

Keywords: *Roads, Rural areas, Developing countries, Design standards, Geometry, Safety, User needs, Foreign technology.

This Report discusses the underlying principles upon which it is recommended that geometric design standards for rural roads in developing countries should be based. The basic elements of geometric design are listed and an indication is given of their purpose and the objectives normally sought when geometric standards are adopted. The development of geometric design standards from first principles is discussed, with particular reference to existing geometric design policies currently being applied in industrialized countries. Finally, the problem of devising appropriate standards for roads in developing countries is considered. It is concluded that the basic standards of safety and comfort that are appropriate for a particular country are a matter for the national authorities to decide. In setting geometric standards consideration should be given to the costs of vehicle operation as well as to road construction costs. (Copyright (c) Crown Copyright 1981.)

PB82-113671 PC A03/MF A01
National Council for Scientific Research, Lusaka (Zambia).
An Investigation of the Properties of Rural and Urban Bricks
R. J. S. Spence. Jan 71, 40p Rept nos. NCSR/TR-9, BR-3

Keywords: Construction materials, *Bricks, Structural clay products, *Building materials, Fabrication, Sampling, Brick industry, *Zambia, Foreign technology, Developing country application.

In the investigation, 38 samples of urban bricks and 14 samples of rural bricks were obtained from a total of 18 different brickworks. Most of the brickworks were also visited in the course of the investigation. The first two sections of the report deal with the properties of urban and rural bricks, respectively. As all samples of urban bricks were coal-fired, and all samples of rural bricks were wood-fired, a clear distinction can be made. A third section deals with the typical manufacturing processes in each category, and this is followed by a summary and conclusions. An appendix dealing with some of the properties of typical brick soils is included. Most brick quality was found to be low, unsuitable for unplastered use let alone load-bearing use. Many suggestions for improving brick quality are given.

PB82-114000 PC A02/MF A01
Instituto Tecnico de Capacitacion y Productividad, Guatemala City. Dept. Tecnico Didactico.
Guardafuego: Manual de Prevencion, Combate y Extincion de Incedios Forestales. (Fire Control: Manual of Prevention. Fighting and Extinguishing Forest Fires).
Feb 81, 20p Rept no. INTECAP-81-001
Text in Spanish.

Keywords: Forest fires, Fire prevention, Fire fighting, Fire hazards, *Fire safety, *Forestry, Fire detection, Foreign technology.

This report describes in simple, everyday Spanish language, the many ways in which any concerned citizen can help prevent forest fires. It includes general instructions on preventive measures, immediate steps to be taken when a fire is detected and, the organizations of citizens groups to fight forest fires.

PB82-116518 PC A03/MF A01
Physical Research Lab., Ahmedabad (India).
The Periodical Management System
Technical note
D. R. Kulkarni, R. R. Bharucha, and U. A. Ghiya.
1980, 42p Rept no. PRL/TN-80-02

Keywords: *Libraries, Automation, Periodicals, Information systems, Procurement, User needs, Computer programming, Laboratories, *India, *Information services.

A computerized Periodical Management System has been developed and implemented for the Library of the Physical Research Laboratory. The system monitors various procedures related to procurement of periodicals. It also processes the information related to periodicals and presents it in the form of comprehensive reports. Thus the system leads to better management of periodicals as well as better service to the users. The system has been made operational on the Computer System IBM 360/44 under the operating system 44 PS.

PB82-116765 PC A14/MF A01
Instituto Tecnico de Capacitacion y Productividad, Guatemala City.
Manual de Plantas Procesadoras de Carne. (Manual of Meat Processing Plants).
Apr 80, 304p Rept nos. INTECAP-81-002, DI-S-015-80
Text in Spanish.

Keywords: Manuals, Food inspection, Meat, National government, Regulations, *Food processing, Food sanitation, Beef cattle, Department of Agriculture, Slaughterhouses, Training devices.

This manual was prepared by specialists on meat inspection from the U.S. Dept. of Agriculture as an aid in training inspectors for meat processing industries. It focuses on the sanitary aspects of meat work and follows the U.S. Dept. of Agriculture recommendations on this matter. It is destined to be used by meat inspectors as an aid in understanding and for better practice of those regulations. It covers sanitary aspects in relation to the facilities, the machinery, equipment, water supply, handling of meat products and gives instructions on how to handle the live animals before killing, including horses, swine or sheep.

PB82-116773 PC A03/MF A01
Tribhuvan Univ., Kathmandu (Nepal). Research Centre for Applied Science and Technology.
A Survey of the Information System in Nepal Relating to New and Renewable Sources of Energy
May 80, 33p

Keywords: *Nepal, Information systems, *Energy, Developing countries, *Information services, Foreign countries, *Energy source development, Developing country application.

This report explores the role of information in Nepal in supporting energy development and use. Separate chapters are devoted to: Characteristics and activities of energy organizations and their staff; energy information needs of users; information sources used; and information dissemination and exchange.

PB82-117250 PC A05/MF A01
Brackishwater Aquaculture Development Centre, Djepara (Indonesia).
Bulletin of the Brackishwater Aquaculture Development Centre. Volume 5, Number 1 and 2, January and July 1979
Oct 80, 77p

Keywords: Shrimps, *Aquaculture, Transportation, Salinity, Growth, Snails, Pest control, *Indonesia, Foreign technology.

Contents: Improved method of shrimp fry transport; Results of polyculture of milkfish and shrimp at the Karanganyar provincial demonstration ponds; The effect of high salinity on growth and survival of the giant tiger shrimp under cultivation in the earth pond; Effect of copper sandoz on the snail, Cerithidea cingulata; Integrated brackishwater farm system in Indonesia.

PB82-117328 PC A04/MF A01
Brackishwater Aquaculture Development Centre, Djepara (Indonesia).
Bulletin of the Brackishwater Aquaculture Development Centre. Volume 6, Number 1 and 2, January and July 1980
May 81, 73p

Keywords: Shrimps, *Aquaculture, Brackish water, Growth, Diets, Survival, *Indonesia, Foreign technology.

Partial contents: Semi-intensive monoculture of the Tiger Shrimp; Shrimp culture and its improvement in Indonesia; The survival and growth of the postlarval Tiger Shrimp; Mass production of Macrobrachium post larvae in the brackishwater Aquaculture Development Centre Jepara, Indonesia.

PB82-117862 PC A04/MF A01
General Accounting Office, Washington, DC. International Div.
AID and Universities Have Yet to Forge an Effective Partnership to Combat World Food Problems
Report to the Congress.
16 Oct 81, 52p Rept no. ID-82-3

Keywords: Universities, *Food supply, Developing countries, Foreign aid, Coordination, Cooperation, *Technical assistance, Agency for International Development, Famine, Interagency cooperation.

This is the GAO report on AID implementation of Title XII, Famine Prevention and Freedom From Hunger (sections 296-300) of the Foreign Assistance Act. Title XII authorizes the Agency for International Development to improve involvement of U.S. land-grant universities in its agricultural assistance programs.

PB82-118969 PC A03/MF A01
Institut Superieur de Developpement Rural de Bukavu (Zaire).
Technologies Appropriees. (Appropriate Technologies).
Georges Defour. 1981, 30p*
Text in French.

Keywords: Rural areas, Developing countries, Technology, Water supply, Heating, Food processing, *Appropriate technology, Developing country application.

This practical French language manual describes briefly how to make many appropriate technology tools to improve rural life. Among the topics covered are: making a cart; distilled water; more efficient stoves; peanut hulling; rat traps; water filters; solar water heaters; rehydration of diarrhetic children; refrigerators; corn shellers; solar crop dryers; surveying equipment; soya grillers; solar cookers; wind powered electricity generation; and pedal powered rotary saws.

PB82-119116 PC A03/MF A01
National Physical Lab., New Delhi (India).
Sun: The Energy Source of the Future (Solar Energy)
1981, 36p

Keywords: *Solar energy, Solar cells, Reviews, India, Foreign technology, Solar collectors, Solar heating systems, Solar cooling systems, Solar dryers, Solar water heaters.

Reviews research conducted by the National Physical Laboratory (India) on solar energy.

PB82-119199 PC A02/MF A01
Shri Ram Inst. for Industrial Research, New Delhi (India).
The Environmental Imperatives of Development, Founder Memorial Lecture (17th)
B. P. Pal. 1981, 18p

Keywords: *Natural resources, Economic development, *India, *Environmental impacts, *Industrial development, Conservation, Forest land, Agriculture, Industries, Plant genetics, Soil erosion.

The report is a lecture which describes the environmental issues which must be considered in development of India. It discusses the Sixth Five Year Plan (1980-85) and makes comments on conservation of natural and agricultural resources.

PB82-119603 PC A05/MF A01
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Development and Institutionalization of Agricultural Resource Planning Concepts and Procedures in Developing Countries
Staff rept.
James B. Johnson. Sep 81, 100p Rept no. AGES-810909

Keywords: *Agricultural economics, Developing countries, *Land use, Production, Farm crops, Acclimatization, Statistical data, Dominican Republic, Costa Rica, Nicaragua, Syria, Honduras, Tables(Data), Economic models, Constraints, Institutional framework.

This report documents the development and adaptation of agricultural resource planning concepts and procedures for use in developing countries. Major concepts were those applicable to land resource delineation, major land use delineation, and the disaggregation of agricultural production and cropping pattern statistics to land resource delineations. The procedures used in the five developing countries are discussed. A limited discussion is presented on the design and application of two information systems that manage information obtained by inventory and assessment. The goals, purposes, and products of institutionalization activities in each of the five countries are presented.

PB82-122748 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Transport Problems of the Urban Poor in Kuala Lumpur
C. R. Eastman, and D. Pickering. c1981, 29p Rept no. TRRL-SUPPLEMENTARY-683
Also pub. as ISSN-0305-1315.

Keywords: Urban transportation, *Malaysia, Travel patterns, *Transportation, Attitudes, Developing countries.

A program of research is being undertaken, studying transport problems of the poorer sections of the population in cities in a number of developing countries. This report describes the results of one of these studies conducted in Kuala Lumpur, the capital of Malaysia. Surveys of travel habits and attitudes were undertaken and the results were used to provide information on modal choice, trip purpose and expenditure on transport of squatter and other low income communities within the City. (Copyright (c) Crown Copyright 1981.)

PB82-127135 PC E05/MF E05
Plastics and Rubber Inst., London (England).
Plastics and Paints Against Corrosion: International Conference Held at Thames Polytechnic, London, on 12 November 1980
c1980, 89p Rept no. ISBN-0-903107-30-9

Keywords: *Corrosion, *Plastics, *Paints, Meetings, Protective coatings, Polyvinyl chloride, Pipes, Assessments, Foreign technology, Vinylidene fluoride polymers.

To highlight the importance of polymers in the fight against corrosion, both as essential components in paints and surface protectives and also as structural replacements for more traditional materials.

PB82-127226 PC A07/MF A01
National Research Council, Washington, DC.
Age Misreporting and Age-Selective Underenumeration: Sources, Patterns, and Consequences for Demographic Analysis
Rept. no. 4
Douglas C. Ewbank. May 81, 129p Rept no. ISBN-0-309-03141-9
Library of Congress catalog card no. 81-81759. Sponsored in part by Council on Environmental Quality, Washington, DC.

Keywords: Populations, Developing nations, Demography, Growth, Fertility, Mortality, Errors, *Population control, Data acquisition.

The report reviews the data and conclusions of studies of age misreporting errors, age-selective underenumeration, and the interview process regarding the collection of information on age. The report also reviews techniques used to detect distortions in reported age distributions, and it describes typical patterns of distortion and how these distortions affect demographic estimation procedures. Age misreporting is only one type of response error that arises in data collection processes. Others include underreporting and misdating of vital events, inaccurate reporting of information on individual and household characteristics, and the failure to include required or requested information.

PB82-127697 PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Refuse Management in Developing Nations
John Thompson. Aug 81, 29p

Keywords: Refuse disposal, Solid waste disposal, Developing countries, Composts, *Waste disposal, *Waste treatment, Equipment, Cost analysis, Maintenance, Sanitary landfills, Incineration.

This publication is directed toward planning and organizing the collection and disposal of refuse in developing nations. The report describes various methods of collection such as bulk bins and household refuse, types of equipment used and the costs for each type. Other pertinent information on life cycle costing, maintenance needs, contract collection, transfer stations, incineration and composting is also presented.

PB82-129180 PC A06/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Bangladesh
Apr 80, 108p AID-PB-AAJ-127
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Bangladesh, *Environmental surveys, Water resources, Arid land, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Population growth, Pollution, Fisheries, Legislation, Developing country application.

Bangladesh is one of the most densely populated countries in the world--a situation that has placed tremendous pressures on its natural resource base. This draft report discusses the nation's plight while profiling its resources of water, soils, forests, wildlife, coastlands, fisheries, and minerals, as well as its climatic and geographic characteristics.

PB82-129198 PC A04/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Ecuador
Sep 79, 66p AID-PN-AAJ-125
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Ecuador, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Soils, Pollution, Legislation, Developing country application.

This draft report examines the status of Ecuador's environment and climate, water, forest, soil, wildlife, petroleum, and mineral resources, with key points illustrated by charts and maps. Also provided are overviews of the country's demographic characteristics and current environmental legislation, as well as a brief description of the country's economy.

PB82-129206 PC A04/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Report on Cape Verde
Aug 80, 59p AID-PN-AAJ-201
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Soil erosion, *Natural resources, *Cape Verde Islands, *Environmental surveys, Arid land, Soils, Water resources, Vegetation, Wildlife, Soil conservation, Land use, Economic factors, Developing country application.

The Cape Verde Islands currently suffer from soil degradation, improper land usage, and shortages of fuel and water. Such are the conclusions of this draft report which profiles the natural resources of these 10 islands and five inlets, and provides related geographical, climatic, land use, and population data.

PB82-129214 PC A05/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Report on Mali
May 80, 78p AID-PN-AAJ-202
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Mali, Droughts, *Environmental surveys, Water supply, Soils, Vegetation, Wildlife, Mineral deposits, Livestock, Populations, Economic factors, Pollution, Developing country application, Desertification.

In Mali, the adverse effects of the recent drought, amplified by the increase in both human and livestock populations, have set in motion a series of events that have resulted in the desertification of large land areas. Most of the nation's environmental problems are associated with this cycle of desertification. This draft report examines this situation by providing environmental profiles of Mali's water, soils, vegetation, wildlife, and mineral resources.

PB82-129222 PC A06/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Report on Senegal
Sep 80, 106p AID-PN-AAJ-204
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Senegal, *Environmental surveys, Water resources, Arid land, Soils, Vegetation, Wildlife, Mineral deposits, Agriculture, Economic factors, Pollution, Developing country application, Desertification.

Senegal's slow response to rapid economic, social, and technological changes has led to several environmental problems. This draft report focuses on these issues while profiling the nation's natural resources of water, soils, vegetation, wildlife, minerals, and protected areas. The relationships of these resources to enterprises such as agriculture, fisheries, pastoration, and fuelwood production are highlighted in terms of the country's geographical and social characteristics, economy, and political structure.

PB82-129230 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Environmental Profile of the Republic of Zaire, Phase I
Jun 80, 96p AID-PN-AAJ-206
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Zaire, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Soils, Pollution, Parks, Developing country application.

Because of its slow economic and population growth, Zaire's natural resource base is not under serious assault. This draft report discusses both of these perspectives while profiling Zaire's water, soil, forestry, and wildlife resources. An overview of the nation's physical, demographic, economic, and social characteristics as well as national park and reserve data is also provided.

PB82-129248 PC A03/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
An Integrated Approach to Guayule Research
William G McGinnies, and Jonathan G. Taylor. Apr 79, 29p AID-PN-AAH-640
Grant AID/ta-G-1111

Keywords: Fiber plants, Plant growth, Irrigation, Harvesting, Processing, Plant breeding, *Rubber, Environmental impacts, Soils, Arid land, Feasibility, *Guayule, Parthenium argentatum, Developing country application.

Development of guayule, Parthenium argentatum, as a dependable source of domestic rubber is complicated by the plant's anatomical, physiological, and genetic complexity, especially when cultivated under conditions not native to it. Domestication of the guayule plant involves several problems, among them genetic manipulation and breeding, the expense of guayule stand establishment, and the effects of irrigation on its rubber-producing capacity. In addition, economically feasible rubber production depends on the assessment of economic, environmental, institutional, and socioeconomic factors.

PB82-129255 PC A06/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Topical Investigation and Analysis of Nutritional Supplements in Family Planning Programs in India and Pakistan
Michael v.E. Rulison. 1970, 75p AID-PN-AAH-576
Contract AID/nesa-460

Keywords: Family planning, *Nutrition, Fertility, Developing countries, *India, *Pakistan, Programs, *Birth control, Infants, Foreign technology, Mothers, Developing country application.

The theory that improving the nutritional status of mothers and infants lowers fertility rates has been divided into several hypotheses concerning the effects on fertility of nutrition interventions in family planning programs. This report uses a modified systems analysis approach to test these hypotheses in India and Pakistan in terms of such variables as numbers of births and deaths, nutritional levels, and numbers of family planning acceptors.

PB82-129263 PC A07/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Topical Investigation and Analysis of Promoting Family Planning Through Health Services
Fredric D. Kennedy. 1970, 127p AID-PN-AAH-577
Contract AID/nesa-460

Keywords: Family planning, Promoting, *Birth control, Reproduction(Biology), Fertility, *Health care delivery, Models, Data, Health services, Developing country application.

This investigation is concerned with the potential that health services provide for the promotion of family planning. This area of interest has many implications; these include economies of shared facilities and personnel, behavioral aspects of combined programs, priority conflicts in joint operations, long-term effects of fertility arising from mortality reduction, etc. The results of this investigation--three models for analysis and a structure of hypotheses to be tested using these models--can best be summarized under two general headings: first, the long-term effects of health services upon fertility behavior through mortality reduction and, secondly, the health service system as a means of promoting family planning.

PB82-129271 PC A09/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on India
F. Bauman. Mar 80, 178p AID-PN-AAH-752
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *India, *Environmental surveys, Water resources, Fisheries, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Population growth, Soils, Pollution, Legislation, Developing country application.

Many of India's environmental problems arise from attempts to meet the basic needs of its enormous population for food and energy. This draft report profiles India's environment and natural resources in order to specify these problems. Basic descriptions are provided on the country's topographical and geological characteristics and of such natural resources as climate, water, soils, forests, wildlife, coastlands, and beaches, fisheries, minerals, and air and the atmosphere.

PB82-129289 PC A05/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Report on Morocco
S. A. Parker. Feb 80, 98p AID-PN-AAH-874
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Morocco, Profiles, Economic development, Population growth, *Environmental surveys, Environmental impacts, Soil erosion, Water pollution, Vegetation, Legislation, Agriculture, Forestry, Wildlife, Arid land, Developing country application, Desertification.

Desertification due to accelerating population growth, and heavy dependence on agriculture has become a growing threat to the economic and ecological balance of many developing countries. To address this situation, environmental investigations, such as this draft environmental report of Morocco, are urgently needed. The report consists of an introductory description covering Morocco's geography, population, and economic characteristics, followed by an examination of the country's environment and natural resources, legislation governing the environment and natural resources, including flora, mineral resources, soils, water resources, legislation governing the environment and natural resources, and relevant organizations.

PB82-129675 PC A02/MF A01
Department of Meteorological Services, Salisbury (Rhodesia).
Calendar Singularities of Rainfall in Rhodesia
D. L. McNaughton. 29 Apr 70, 12p

Keywords: Rainfall, Climate, *Rhodesia, Periodic variations, Hail, Ice, Freezing, Rainfall intensity, Comparison, *Meteorology.

For each of 55 stations rainfall totals accumulated over periods varying between 20 and 71 years are examined for Rhodesia according to calendar date. The agreement as to which dates favor the most rain is remarkable. It is also shown that Salisbury and Bulawayo derive almost coincident peaks with rain falling in different years. Bowen's meteor hypothesis could be the explanation, especially as the area of southern hemisphere land is comparatively small, and interhemispheric exchange of air is fairly slow.

PB82-129909 PC A05/MF A01
Office of Science and Technology, Washington, DC.
Listado de Categorias de Materias COSATI. (COSATI Subject Category List).
Dec 64, 80p
Text in Spanish.

Keywords: Documentation, Subject indexing, Information retrieval, *Information services, Technical reports, Indexes(Documentation), Spanish language.

The list provides a basis for the subject grouping of reports for announcement and distribution purposes and for general categorizing and indexing. There are 22 broad subject fields and 178 groups. Scope notes indicate the subject coverage of each group and give cross-references to related groups.

PB82-130659 PC A05/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Profile on Tunisia
A. P. Grant. Feb 80, 82p AID-PN-AAH-876
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Tunisia, *Environmental surveys, Arid land, Soils, Population growth, Agriculture, Wildlife, Mineral deposits, Soil erosion, Water resources, Pollution, Legislation, Developing country application, Desertification.

Intensified by the country's population increases, the major problem burdening Tunisia today is a swiftly eroding landbase. This report of the natural resources of this small, arid country emphasizes major environmental problems, legislation already passed for environmental protection, and provides recommendations to reverse environmental degradation. The survey of the country's water, soils, lands, wildlife, and mineral resources reveals several critical problems.

PB82-130667 PC A04/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Environmental Profile of Liberia, Phase I
P. T. Hazelwood. Jul 80, 72p AID-PN-AAG-978
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Liberia, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral desposits, Economic factors, Soils, Population growth, Pollution, Developing country application.

Liberia has a tropical climate favoring high forest vegetation and is rich in natural resources, notably iron ore, timber, and rubber. Its major topographical and biogeographical regions include a coastal plain, a belt of rolling hills, a belt of low mountain ranges and plateaus, and northern highlands. This report is a preliminary review of information available in the United States on Liberia's environment and natural resources. Topics covered by the report include the nation's physical, demographic, and social and economic characteristics; renewable resources; non-renewable resources; parks, reserves, and other protected areas.

PB82-130675 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Jordan
F. Bauman. Aug 79, 100p AID-PN-AAG-979
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Jordan, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Soils, Legislation, Pollution, Populations, Developing country application, Deforestation.

Jordan is not endowed with abundant natural resources. Only 9% of the land is cultivable and forest cover less than 1% of the country. This draft report profiles Jordan's natural resources including water, forests, soils, wildlife, fisheries, beaches, minerals, and atmosphere. Demographic and economic data are also provided.

PB82-130931 PC A14/MF A01
CH2M Hill, Inc., Corvallis, OR.
Proposed Water Management Program for Major Irrigation Schemes in Sri Lanka
Edwin Lance, Roger Willsie, Michael Moore, Mel Hagood, and Doral Kemper. Feb 79, 315p AID-PN-AAG-841
Contract AID/OTR-C-1618

Keywords: *Irrigation, *Water resources, *Sri Lanka, Organizations, Water supply, Water distribution, Farms, Water consumption, Ditches, Local government, Project planning, Benefit cost analysis, Evaluation, Developing country application, Water management(Applied).

Because of poor irrigation management, much of Sri Lanka's agricultural lands can be farmed only occasionally or only during the Maha season--despite the fact that sufficient rainfall exists for one or more crops per year. The purpose of this study is to determine the institutional, organizational, and physical components of a proposed A.I.D. irrigation program in Sri Lanka. The country's water management problems are primarily due to poor maintenance and a lack of control over water use.

PB82-130949 PC A08/MF A01
Community Systems Foundation, Ann Arbor, MI.
Analysis of Nutrition-Related Activities in Honduras
David Stanfield, James Eckroad, and David Sahn.
Dec 79, 153p AID-PN-AAH-242
Contract AID/SOC/PDC-C-0082

Keywords: *Nutrition, Nutritional deficiency diseases, Developing countries, *Honduras, *Children, Law(Jurisprudence), National government, Planning, Diet, Foreign technology, Developing country application.

Present estimates indicate that nearly 75% of Honduras' preschool population and nearly 50% of its school-age population suffer from some degree of malnutrition. In 1976, the Government of Honduras established the Sistema de Analisis y Planifacion de la Alimentacion y Nutricion (SAPLAN) to plan and stimulate the implementation of nutrition programs. However, SAPLAN has encountered numerous problems. A major difficulty has been the inability of the Honduran and U. S. bureaucracies to operate smoothly and to reach agreement on administrative procedures satisfying the legal requirements of both governments. A second difficulty has been the slowness, cost, and limited impact of many of SAPLAN's projects. The authors recommend that USAID form a multisectoral nutrition team, drawing from its agricultural, education, health, and engineering sections, establish an internal planning group, and develop a simplified model of the development process in Honduras.

PB82-130956 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Bolivia
Jun 79, 78p AID-PN-AAG-982
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Bolivia, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Soils, Pollution, Fisheries, Legislation, Developing country application.

Bolivia is a landlocked nation whose topography is an important factor in considering its environmental problems. This draft report describes the nation's water, soil, mineral, wildlife, fishery, and forest resources. The responsibilities of relevant organizations and standing legislation concerning the development of natural resources are outlined. Population data and economic information are also provided to demonstrate how their growth patterns have been defined by the environment.

PB82-130964 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Guatemala
May 79, 98p AID-PN-AAG-981
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Guatemala, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Soils, Pollution, Coasts, Legislation, Developing country application.

This draft report profiles the status of Guatemala's natural resources. The resources investigated include water sources, forest areas, soils, wildlife, coastlands, beaches, fisheries, and minerals. Government and non-governmental agencies which deal with environmental issues are discussed; environmental regulations are enumerated in detail. A general economic profile highlighting both industrial and agricultural production concludes this report.

PB82-130972 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on the Philippines
M. S. Chakroff. Jan 80, 78p AID-PN-AAH-753
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Philippines, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Soil erosion, Pollution, Legislation, Developing country application, Deforestation.

The Republic of the Philippines is an archipelago composed of an estimated 7,100 islands located along the southwest rim of Asia. This environmental report is a profile of the Republic's indigenous natural resources including climatic factors, water and energy sources, forests, seismic activity, soils, wildlife, minerals, and coasts and beaches. In addition, government and non-government agencies involved with environmental issues and legislation are described.

PB82-130980 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Thailand
Oct 79, 97p AID-PN-AAG-972
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Thailand, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Fisheries, Populations, Pollution, Soils, Legislation, Developing country application.

Thailand's 46 million people make it one of the world's 20 most populous countries. This draft report profiles Thailand's natural and environmental resources and many of its environmental problems. An overview is provided of natural resource- and environment-related organizations and legislation and of the country's population and economy.

PB82-131004 PC A05/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Sri Lanka
Nov 78, 84p AID-PN-AAG-973
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Sri Lanka, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Pollution, Soils, Legislation, Developing country application.

Opportunities for developing Sri Lanka's water, forest, and soil resources exist, but such development must proceed rationally in order to prevent a recurrence of environmental deterioration. This report surveys the country's renewable resources (water, forest, wildlife, fisheries, and the atmosphere) and nonrenewable resources (minerals, soil, and coastal land) and cites potentialities and problems in the island's two climatic zones.

PB82-131012 PC A04/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Nepal
M. S. Chakroff. Jul 79, 64p AID-PN-AAG-975
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Nepal, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Pollution, Soil erosion, Populations, Legislation, Developing country application, Deforestation.

By 1988, Nepal may lose its most precious natural resource--its forest lands. This draft report reviews the natural resources and related legislation and institutions of this small, land-locked country, located between northern India and Tibet, and identifies its major environmental problems.

PB82-131020 PC A03/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Mauritania
Jan 79, 46p AID-PN-AAG-977
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Mauritania, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Populations, Legislation, Pollution, Soils, Developing country application, Desertification.

An extended drought, aggravated by population pressures, threatens the traditional agricultural base and fragile environment of Mauritania with rapid desertification. This report assesses Mauritania's overall environmental situation, focusing on its population, its government's environmental organizations, environmental legislation, natural resources, and the environmental effects of its economy.

PB82-131038 PC A06/MF A01
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Report on Arab Republic of Egypt
M. J. Wilkinson. May 80, 117p AID-PN-AAH-877
Contract NPS-CX-0001-0-0003
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Egypt, Profiles, Agriculture, Land use, Irrigation, *Environmental surveys, Population growth, Water resources, Soils, Vegetation, Wildlife, Land reclamation, Dust storms, Industries, Environmental impacts, Pollution, Developing country application.

Current environmental problems facing Egypt are caused by the concentration of intensive agricultural irrigation and high population densities on 4% of the nation's land area. The report analyzes Egypt's natural resources of minerals, water, soil, flora and fauna; and the impact on these resources by irrigation projects, land reclamation, dust storms, and industry. A brief final section lists the country's major environmental problems and strategies to counter them.

PB82-131046 PC A04/MF A01
Library of Congress, Washington, DC. Science and Technology Project.
Draft Environmental Report on Haiti
Jan 79, 70p AID-PN-AAG-980
Sponsored in part by National Committee for Man and the Biosphere, Washington, DC.

Keywords: *Natural resources, *Haiti, *Environmental surveys, Water resources, Wildlife, Forestry, Agriculture, Mineral deposits, Economic factors, Soil erosion, Population growth, Pollution, Legislation, Developing country application.

Haiti's current, almost unparalleled environmental degradation is due to interrelated problems of overpopulation, deforestation, and soil erosion. This draft environmental report assesses Haiti's environmental problems, natural resources, economy, and the Government of Haiti's environmental agencies and legislation.

PB82-131061 PC A05/MF A01
Elmendorf (Mary), Washington, DC.
Changing Patterns of Fertility: The Impact of Contraceptive Technology on a Maya Village
1980, 92p AID-PN-AAH-954
Grant AID/pha-G-1184
Sponsored in part by Research Inst. for the Study of Man, New York.

Keywords: Family planning, Fertility, Contraceptives, Mexico, *Birth control, Counseling, Socioeconomic factors, Education, Foreign technology, Developing country application, Population growth, Yucatan.

Acceptance and implementation of strategies to limit family size have increased among the women of Chan Kom, a Mayan peasant village located in Yucatan. This report explores the factors supporting fertility control by analyzing the counseling and services of the family planning program and the age, health condition, and desired number of children of women who accept and use some form of birth control. Also assessed are socioeconomic variables such as the education level of women and children and income-generating work of women and men both in and outside the village.

PB82-131079 PC A07/MF A01
Group Seven Associates, Inc., Alexandria, VA.
Tourism Training: Mexican Needs/U.S. Resources
Final rept.
Mar 80, 132p AID-PN-AAH-533
Contract AID/SOD/PDC-C-0205

Keywords: Travel, *Mexico, *Training, Specialized training, Manpower, Requirements, Surveys, Developing country application, *Tourism.

Rapid expansion of the tourism sector in Mexico, combined with tourists' expectations and competition from other countries, has put enormous pressure on Mexico's tourism training institutions. This paper presents the final report of a study conducted to assess training needs, determine the U. S. capacity to assist, and develop a time-phased plan of options to redress the manpower shortages. The study was based on 59 formal interviews with Mexican Government, industry, and school personnel and on responses from 87 U. S. universities which provide training in tourism-related areas.

PB82-131087 PC A04/MF A01
Agency for International Development, Washington, DC.
Health Sector Policy Paper
Mar 80, 67p AID-PN-AAH-964

Keywords: Developing countries, Accessibility, Sanitation, Public health, United States, Water, Health policies, Developing country application, Health programs, Agency for International Development, *Health care delivery, Health status, *Health planning, *Health.

Developing nations suffer from a lack of basic health care services, limited access to safe water and sanitary human waste disposal facilities, widespread incidence of communicable diseases, and shortsighted planning of the projects designed to alleviate these and other problems. This paper describes A.I.D.'s program to address developing country health needs, a program based on the belief that health is basic to human well-being and essential for achieving development goals.

PB82-131095 PC A08/MF A01
Agency for International Development, Tegucigalpa (Honduras).
Assessment of the Public Health Sector in Honduras, 1975-1985
Jun 80, 175p Rept no. PN-AAH-878

Keywords: *Honduras, Public health, Developing countries, Assessments, Sanitation, *Health care delivery, *Environmental management, Environments, Financing, Management, Logistics, Demography, Ethnic groups, Health policies, Foreign technology, Disease control, Personal health services, Teaching hospitals, Human resources, Developing country application.

The Honduran health sector is complex, ranging from a sophisticated teaching hospital in Tegucigalpa to health workers providing simple treatment in village

homes. This health sector assessment concentrates on human resources, management, logistics, and financing in three priority areas--communicable disease control, environment and sanitation, and personal health care.

PB82-131103 PC A03/MF A01
Johns Hopkins Univ., Baltimore, MD. Dept. of International Health.
Oral Fluid Therapy in Diarrhea and Dehydration: Current Concepts and Practical Considerations
Robert L. Parker. Jul 80, 33p AID-PN-AAH-928
Contract AID/DSPE-C-0055

Keywords: Diarrhea, Dehydration, Ingestion(Biology), *Children, Nutritional deficiency diseases, *Diseases, Therapy, Implementation, Developing country application, Fluid therapy.

Dehydration--the loss of water and electrolytes through diarrhea--can fuel a vicious cycle in a child in which malnutrition begets diarrhea and diarrhea causes further malnutrition, until the child ultimately dies. The recent widespread use of oral fluid therapy (OFT) has significantly reduced diarrhea mortality, showing it to be an effective cure of relatively lower cost and greater convenience than intravenous feeding therapy. This report outlines the major approaches to OFT, ways of implementing these approaches, and issues still unresolved.

PB82-131111 PC A03/MF A01
Farwell (A.E.), Vienna, VA.
Schistosomiasis Control in the Dominican Republic: Recommendations for Appropriate Course of Action
A. E. Farwell. 30 Aug 80, 47p AID-PN-AAH-929
Contract AID/LAC/C-1401

Keywords: *Schistosomiasis, Infectious diseases, *Dominican Republic, National government, Public health, Benefit cost analysis, Foreign technology, Disease control, Agency for International Development, Shistosoma mansoni.

Prior to approving a request from the Government of the Dominican Republic (GODR) to USAID to provide assistance in a schistosomiasis control program, a team of scientists was called on to evaluate the present status of schistosomiasis and of on-going eradication programs. This report presents the findings of an economic analyst contracted to work with this team, review their findings, and recommend an appropriate course of action to USAID.

PB82-131327 PC A06/MF A01
Agency for International Development, Washington, DC.
Central America: Small-Farmer Cropping Systems
Project impact evaluation rept. no. 14
Harlan H. Hobgood, Rufo Bazan, Flolio Ehrich, Francisco Escobar, and Twig Johnson. Dec 80, 112p
Rept no. AID-PN-AAH-977
Prepared in cooperation with Centro Agronomico Tropical de Investigacion y Ensenanza.

Keywords: *Agricultural economics, *Central America, Research projects, *Farming, Production, Evaluation, Benefit cost analysis, Developing country application, Small farms.

This report evaluates a research project to increase small-farmer production in Central America by developing improved cropping practices.

PB82-131343 PC A04/MF A01
Agency for International Development, Washington, DC.
Water Supply and Diarrhea: Guatemala Revisited
Evaluation special study no. 2
Daniel Dworkin, and Judith Dworkin. Aug 80, 52p
Rept no. AID-PN-AAJ-007
Prepared in cooperation with Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.

Keywords: *Guatemala, Diarrhea, *Water supply, Gastrointestinal diseases, Rural areas, Sanitation, *Water treatment, *Diseases, Developing countries, Sewage disposal, Waste disposal, Foreign technology, Developing country application, Environmental health, *Water pollution.

Evidence indicates that improved water supplies in rural communities reduce the incidence of diarrhea. To demonstrate this phenomenon, two communities in Guatemala, Florida Aceituna and Guanagazapa, were selected for study due to their similar population, environment, and health characteristics. The former, which obtained water from shallow wells and rivers, served as a control to establish a norm for diarrheal incidence without project assistance. The latter was provided with a piped chlorinated supply system. Data from both communities were analyzed independently. Halfway through the project, a program to alter sanitary behavior and encourage latrine construction was instituted in Guanagazapa, allowing changes in diarrheal incidence to be ascribed either to water alone or to both water and the new program. The mean amount used per person over the project was 25 liters daily for each person in Florida Aceituna and 68.4 liters in Guanagazapa. Eighty percent washed their clothes and bathed at home in Guanagazapa compared to less than 1/3 who did laundry and 1/5 who bathed in the control village. Guanagazapa showed a significant improvement in sanitary awareness over the project period and 79 new latrines were installed.

PB82-131376 PC A03/MF A01
Population Council, New York. Center for Policy Studies.
The Fertility Impact of Traditional and Changing Childspacing Practices in Tropical Africa
Working paper
John Bongaarts. May 79, 33p WP-42, AID-PN-AAH-321
Contract AID/pha-C-1199

Keywords: Family planning, Fertility, *Birth control, Contraceptives, *Africa, Relationships, Mathematical models, Developing countries, Foreign technology, Developing country application.

This paper presents a mathematical model to study the relationship between fertility levels and intermediate fertility variables such as the proportion reproductive years spent in marriage and the frequency of use of natural or artificial contraceptive measures. This analytic framework is demonstrated by calculating and comparing the fertility rates of one African and two Western societies. Next the author discusses the role of variations in the duration of postpartum abstinence on fertility levels. The relationship between lengths of abstinence (3-30 months) and the proportionate female use of contraceptive on fertility is calculated, and the strong fertility-inhibiting effect of lactation is made evident. For example, according to the model, an 88% decrease in the length of the abstinence period doubles fertility, while a 50% increase in use of contraceptive measures reduces fertility by 50% for all durations of infecundability. Further research into the prevalence of postpartum abstinence customs in Africa is encouraged.

PB82-131442 PC A08/MF A01
Nathan (Robert R.) Associates, Inc., Washington, DC.
The Income and Production of Guyana Rural Farm Households: An Analysis Based on the 1979 Guyana Rural Farm Household Survey
Apr 80, 158p AID-PN-AAH-642
Contract AID-504-INST-781

Keywords: Households, *Guyana, Farms, Income, Rural areas, *Home economics, Recommendations, Surveys, Developing country application.

Obtaining a clear picture of the economic well-being of farm households in Guyana is a prerequisite for providing assistance to the country's poorest and neediest farmers. To this end, the results of a survey of the income and production of Guyana's rural farm households for the year 1978 as derived from interviews of individuals from these families, are presented in this report. Major findings of this report include: (1) four-fifths of rural farm households had annual incomes below Guyana's target level for development assistance; (2) two-thirds of rural farm household income came from off-farm sources; (3) one-third of farm households reported difficulty in obtaining needed production and service inputs for rice production; (4) irrigation systems and conditions were better on non-target farms than on target farms. Based on these findings, the following basic program and policy directives aimed at raising rural farm income are set forth: (1) increasing government support for rural households; (2) encouraging farmers to increase the amount of land under cultivation; (3) improving on-farm water control; (4) creating more opportunities for off-farm employment.

PB82-131491 PC A06/MF A01
American Public Health Association, Washington, DC.
Third Evaluation of the Thailand National Family Planning Program
Program evaluation rept. no. 3
Donald Minkler, and Debhanom Muangman. Feb 80, 125p AID-PN-AAJ-314
Contract AID-pha-C-1100

Keywords: Family planning, *Thailand, *Birth control, Developing countries, Contraceptives, Fertility, Statistical data, Foreign technology, Developing country application, Population growth, Program evaluation.

Since the development of the first family planning (FP) project implemented in Thailand in 1968, great progress has been made there in FP and the use of contraceptives. The NFPP has had the folowing significant impact upon population growth: contraceptive use, especially of the pill, has increased substantially since the commencement of NFPP; fertility is decreasing faster in rural areas than in urban areas; the steady decline in the fertility rates since the mid-1960's has accelerated since NFPP began; and the population growth rate has decreased from 3.6% to 2.6% during 1960-75. For the success of this program to continue, increased support is required from the Royal Thai Government (RTG) and international donors. Other recommendations arising from this evaluation include: (1) giving priority to geographic regions and subpopulations where FP acceptance is low; (2) emphasizing improved management and supervision at the village level; (3) including information about FP in health education programs; (4) giving all health education personnel rural health; (5)evalution the impact of NFPP on health status, (6) continuing pilot projects to determine the use of nonphysician personnel in FP service delivery and (7) continuing subsidy to RTG.

PB82-131582 PC A04/MF A01
Agency for International Development, Washington, DC.
Tunisia: CARE Water Projects
Project impact evaluation rept. no. 10
Ross Edgar Bigelow, Lisa Chiles, Carole Steere Ayad, Brian Cavanagh, and Karl Manzer. Oct 80, 63p
Rept no. AID-PN-AAJ-207

Keywords: *Water supply, *Water pollution, *Tunisia, Research projects, Evaluation, Potable water, *Water wells, Maintenance, Developing country application.

This report evaluates a series of projects conducted by Cooperative for American Relief Everywhere, with partial funding by AID and assistance from the Peace Corps, in which 600 existing Tunisian water sources were renovated. To control water contamination the springs and wells were enclosed with relatively low-cost technology requiring little maintenance. The report describes the impact on availability and use of potable water, on health.

PB82-131632 PC A05/MF A01
Agency for International Development, Washington, DC.
Senegal: The Sine Saloum Rural Health Care Project
Project impact evaluation rept. no. 9
Richard F. Weber, Graham B. Kerr, Herbert B. Smith, and James M. Seymour. Oct 80, 98p Rept no. AID-PN-AAJ-008

Keywords: Africa, Evaluation, Developing countries, Public health, Financing, Family planning, Design, Implementation, Foreign technology, Rural health services, Developing country application, *Senegal, *Health care delivery, Program evaluation, Health services, Health facilities.

This evaluation of the Sine Saloum Rural Health Care project to establish a network of village health huts to deliver basic health services provides a partial answer to this question. With the help of villagers, health huts were constructed and equipped in 200 target communities. Three conditions must be met, however, if the project is to succeed: the huts must earn enough to cover operating costs; government supervision and support must improve; and the medicine resupply system must function. Other problem areas include a

high turnover of hut health workers; the close proximity of the huts to each other which forces some to close; and the high salaries paid to village health workers which drain the systems capital. Recommendations include: altering the health hut financial system to avoid collapse; closing health huts which overlap services; halting construction of additional health huts until the existing huts are improved; including a family planning component; obtaining firm assurances of budgetary support from the government; and strengthening A.I.D.'s project management team. Since this evaluation several corrective measures have been made such as delaying project expansion; recruiting an experienced project manager; studying similar more successful projects and redesigning the project.

PB82-131905 PC A02/MF A01
JRB Associates, Inc., McLean, VA.
Bolivia: State of the Environment and Natural Resources; a Field Study. Executive Summary
Peter H. Freeman, Bradley Cross, Robert D. Flannery, David A. Harcharik, and Gary S. Hartshorn.
Jul 80, 16p AID-PN-AAH-981
Contract AID/SOD/PDC-C-0247

Keywords: *Natural resources, *Bolivia, *Environmental surveys, Wildlife, Parks, Forestry, Soil erosion, Pollution, Developing country application, Rangeland.

This report is the summary of a general review to orient future efforts by AID, the Government of Bolivia and the international assistance community in environmental and natural resources work in Bolivia.

PB82-131913 PC A06/MF A01
JRB Associates, Inc., McLean, VA.
Bolivia: State of the Environment and Natural Resources; a Field Study
Peter H. Freeman, Bradley Cross, Robert D. Flannery, David A. Harcharik, and Gary S. Hartshorn.
Jul 80, 110p AID-PN-AAH-980
Contract AID/SOD/PDC-C-0247

Keywords: *Natural resources, *Bolivia, Wildlife, Forest land, *Environmental surveys, Soil erosion, Watersheds, Pollution, Industries, Public health, Government policies, Developing country application, Rangeland.

During September and October 1979, a multidisciplinary team of experts in environmental and renewable natural resources undertook a general review in Bolivia of the following topics: wildlands and wildlife, natural forests, plantation forests, soil erosion and watershed management, high altitude range management and condition, and industrial and urban pollution and its health impacts. The purpose of the review was to orient future efforts by AID, the Government of Bolivia and the international assistance community in environmental and natural resources work.

PB82-132739 PC A05/MF A01
Agency for International Development, Washington, DC.
The Philippines: Rural Electrification
Project impact evaluation rept. no. 15
David H. Mandel, Peter F. Allgeier, Gary Wasserman, Gerald Hickey, and Robert Salazar. Dec 80, 97p
AID-PN-AAH-976

Keywords: Electrification, Rural areas, Low income groups, Economic analysis, *Philippines, *Electric power, Communities, Developing country application.

A.I.D.'s overall evaluation of its Philippine Rural Electrification (RE) program, consisting of eight successive projects, had limited effect on the rural poor and the economic development process. This program began in 1965 and has since energized 844 (59% of the national total) Philippine municipalities, 9,088 (27%) barrios, 1,159,434 (20%) households, and 101 new cooperatives; resulting in a change of schedule for total national energization from 1980 to 1987. To improve the productive capacity of the poor, cooperatives were organized and lent funds to extend electrical power into their areas. Many of the poor, however, could not afford its installation, continued use, or more than one or two light bulbs a month. Community lighting, such as street-lighting, indirectly helped the poor in various ways, such as by providing greater personal security. Those with sufficient financial resources or skills were able to use the electricity for entrepreneurial activities. RE impact upon development occurred in areas with a concentrated population, available technical skills and capital, and access to large and diverse markets. Active promotion of electricity-dependent investments and projects also increased program impact.

PB82-132754 PC A03/MF A01
Syracuse Univ., NY.
Applied Policy Analysis for Integrated Regional Development Planning in the Philippines
Dennis A. Rondinelli. 1979, 32p AID-PN-AAH-244
Contract AID/ta-C-1356

Keywords: *Regional planning, *Philippines, Urbanization, *Urban planning, Developing countries, Urban areas, Rural areas, Urban development, Policies, Local government, Developing country application.

The development in many LDC's of urban industrial centers at the expense of rural areas requires that national development planning be based on a clear articulation of urban-rural (spatial) relationships. This research paper evaluates the methods of integrated spatial analysis used in A.I.D.'s Bicol River Basin Project in the Philippines in order to develop the framework for such development planning. The Bicol project is of interest for three reasons: (1) the spatial analyses used in it are potentially replicable in other countries; (2) the problems in Bicol addressed by these analyses are common in other LDC's; and (3) a study of the project provides insights into urban-rural relationships and the spatial dimensions of rural poverty that are useful in reformulating national investment strategies.

PB82-132762 PC A04/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Profiles of Basotho Farmers. Part I: Images of Basotho Farmers. Part II: Are the Basotho Subsistence Farmers. Part III: Progressive Farmers in Lesotho
Discussion paper
Gene C. Wilken, and Martin H. Fowler. Jun 79, 59p
LASA/DP-8, AID-PN-AAH-351
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Personnel, *Lesotho, Farms, Characteristics, Manpower, Policies, Land development, *Agriculture, Management planning, Developing country application.

Understanding the complex characteristics of Basotho farmers - who are resilient but who also resist introduction of new crops, tools, or techniques - is necessary if development planning for Lesotho's agricultural sector is to be effective. This report characterizes Basotho farmers through three essays entitled Images of Basotho Farmers, Are the Basotho Subsistence Farmers, and Progressive Farmers in Lesotho. All three studies elucidate the relationship between previous assumptions and present policy. It is uncertain that these programs can effectively disseminate new methods or produce widespread benefits in the agricultural sector. Indeed, they may create social disparity and thus impede agricultural development. Reliance on the inherent hardiness of the Basotho farmer and his highly developed local institutions represents a sounder basis for future sector development.

PB82-132853 PC A17/MF A01
California Univ., Los Angeles. School of Public Health.
Republique Unie Du Cameroun Enquete Nationale Sur La Nutrition: Entreprise Par Le Gouvernement du Cameroun. (Republic of Cameroon, National Inquest on Nutrition: Enterprise for the Government of Cameroon).
Final rept.
Oct 78, 383p AID-PN-AAH-528
Contract AID/ta-C-1240
Text in French.

Keywords: Nutritional deficiency diseases, Developing countries, Africa, Children, Characteristics, *Health, *Children, Mother, Etiology, Mortality, *Nutrition, Morbidity, Diets, Developing country application, Mothers, *Cameroon.

The extent of malnutrition among mothers and children in Cameroon has prompted the Government of Cameroon to undertake a joint research study with the University of California, Los Angeles, School of Public Health to determine the causes and characteristics of this malnutrition. This report, written in French, presents the results of that study. The study is based on a control group of 506 children, 5-years old or under, of relatively high economic rank whose nutritional status can serve as a point of reference for Cameroon and an experimental group of 5,689 children (5-59 months), 3,350 mothers, and 3,383 households. After introductory sections on Cameroon's demography, economy, and health condition are explained. The physical and laboratory signs, (i.e. hemoglobin concentration) of malnutrition in children and mothers are discussed. Conclusions of the study include: chronic malnutrition in young children reflects prolonged deficiencies in calories and proteins; and evidence of malnutrition based on physical traits is more difficult to define in mothers than in children because of the greater impact of environmental factors on the former. Extensive annexes, tables and diagrams, as well as a 64-item bibliography (1955-78) French and English references are appended.

PB82-132861 PC A02/MF A01
Stanford Univ., CA.
Potable Water Supply in Rural Morocco
Jarir S. Dajani. 1 Jan 79, 25p AID-PN-AAH-575
Contract AID/ne-C-1575

Keywords: *Water supply, Rural areas, *Morocco, Improvement, *Water wells, Feasibility, Upgrading, Springs(Water), Potable water, Recommendations, Developing country application.

The shortage of potable water supplies in Morocco has been the target of an extensive project to rehabilitate 400 rural wells in eight provinces. After assessing the project's technical feasibility, the author of this report concludes that such a vast project, besides being difficult to manage, would be too diffuse to show any tangible improvements. The author proposes instead that extensive efforts to rehabilitate wells be undertaken in one, or at most two, provinces; and he provides a model for such a scaled-down effort.

PB82-132887 PC A09/MF A01
BLK Group, Inc., Washington, DC.
Comparative Analysis of National Plans and Budgets of the Sahelian Countries
Nadine Horenstein. Dec 79, 196p AID-PN-AAH-371
Contract AID/afr-C-1199

Keywords: *Management planning, Developing countries, Resources, Allocations, Budgeting, *Africa, Agriculture, Mali, Niger, Senegal, Gambia, Mauritania, Upper Volta, Cape Verde, Chad, Urban development, Trends, Developing country application.

The low rate of return (53%) realized by Sahelian nations from their development plans makes imperative a careful analysis of plans and budgetary resources. This report presents such an analysis with the purpose of identifying trends for future planning. A key factor affecting investment realization rates is the heavy reliance by these nations on external financing. Shortfalls in the availability of foreign assistance have had a crucial impact on investment realization. In addition, there is the problem of mobilization of capital -- a factor which varies considerably on a sectoral and subsectoral basis according to the particular donor institution. Another factor is the frequent revisions of investment levels. These upward and downward revisions are, in turn, related to such factors as inflationary pressures, availability of financing, changing donor priorities, etc. Until recently, the Sahelian nations have allocated substantial portions of their resources to industrial and urban devlopment to the detriment of agriculture. Recent drought has made a change of emphasis even more critical. Mali, Niger, and Senegal are now devoting 24%, 32%, and 14%, respectively, of their rural sector allocations to herd reconstitution and to reversing the deteriorating condition of the rangeland. Infrastructure investment is another priority need. For example, transporting food from surplus-producing areas is often difficult, if not impossible. As a whole, Sahelian nations have devoted relatively small amounts of funds to health, education, and other social services. Programs benefitting people directly, such as village-based health care and formal and non-formal education systems, are urgently needed. A review of annual budgets shows that overall expenditures are growing faster than revenues. This, in combination with a paucity of managerial and technical expertise, prevents these nations from assuming the recurrent costs of donor-financed projects. The remainder of the report consists of individual analyses of the plans and bud-

gets of Gambia, Mali, Mauritania, Niger, Senegal, Upper Volta, Cape Verde, and Chad.

PB82-132895 PC A04/MF A01
Agency for International Development, Washington, DC.
Morocco: Food Aid and Nutrition Education
Project impact evaluation rept. no. 8
Judith W. Gilmore, Carol C. Adelman, Anthony J. Meyer, and Melvyn C. Thorne. Aug 80, 68p AID-PN-AAH-851
Contract AID/pha-C-1199

Keywords: *Morocco, *Food, *Nutrition, Developing countries, Sanitation, Therapy, Children, Diseases, Foreign technology, Developing country application, *Health education, Curricula development.

Although Morocco has a high per capita GNP relative to most developing countries, its income distribution pattern is skewed and the health and nutrition status of many is deficient. In this report, the impact of the introduction by Catholic Relief Services of nutrition education into 250 Moroccan social education centers (SEC's) which distribute PL 480, Title II food is described. To launch this education program, a nutrition institute was established at Marrakech to train a cadre of Moroccan women in basic nutrition and health. This cadre developed a curriculum of practical lessons in nutrition, sanitation, and the treatment of childhood diseases which were presented at monthly nutrition classes held at the SEC's. Class attendance was spurred on by the prospect of obtaining Title II food. There was a significant correlation noted between increased education and improved nutrition in the children taking part in the program.

PB82-132903 PC A09/MF A01
Devres, Inc., Washington, DC.
Socio-Economic and Environmental Impacts of Low-Volume Rural Roads--A Review of the Literature
Program evaluation discussion paper no. 7.
Feb 80, 184p AID-PN-AAJ-135

Keywords: *Roads, Rural areas, Developing countries, Social effect, Economic impact, *Environmental impacts, *Agriculture, Production, *Employment, Developing country application.

The focus of current development investments in transportation has shifted from highways and railroads to low-volume rural roads, but few evaluations of the socioeconomic and environmental impacts of these roads have been conducted. This study reviews the available evaluative literature and presents issues to be considered in designing future rural road projects. Emphasis is placed on the broad social impact of rural roads and the diffusion of benefits to the rural poor. Impact areas in which roads are a significant factor are identified, e.g., agricultural production, employment, health, and education. Examples are offered of the potential benefits and problems of road construction in each impact category and questions are proposed for use in future evaluations.

PB82-133133 PC A16/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Catalog of Holdings and Other References in the Lesotho MOA/LASA Library
Research rept.
Gene C. Wilken, Matsaba J. Leballo, Betty J. Eckert, and Makhothatsa Motteleng. Feb 80, 375p LASA/RR-5, AID-PN-AAH-529
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Bibliographies, *Lesotho, Books, Documents, *Agriculture, Public health, Social sciences, *Natural resources, *Health, *Education, *Employment, Specialized training, Developing country application, Library collections.

In 1978 the Lesotho Agricultural Sector Analysis (LASA) project team compiled a bibliography listing reference materials on agricultural planning and development in Lesotho which were held in collections in the United States, Europe and Africa. Since that time, the acquisition efforts of the LASA project team have focused on obtaining materials from Lesotho, such as national and ministerial documents and technical and statistical reports, as well as project papers, data analyses, and related consultant reports reflecting indigenous research and development activities. This second bibliography represents the collection of the LASA library, which has recently merged with that of Lesotho's Ministry of Agriculture. This combined collection contains the most complete and accessible agricultural and development planning materials and project documents in Lesotho. The bibliography contains nearly 3,000 entries (1841-1979) of English, Italian, Sesuto, German, French, and Spanish publications, and is organized into the following subject categories: geography and natural resources; agriculture; agricultural marketing; industry and commerce; population, employment, and migration; education, training, and extension; health and nutrition; society, culture, and the political process; Lesotho planning and development assistance; and theory and methodology.

PB82-133158 PC A04/MF A01
Agency for International Development, Washington, DC.
Colombia: Small Farmer Market Access
Project impact evaluation rept. no. 1
G. R. van Raalte, Steve Singer, Benjamin Severn, and Jose C. Colon. Dec 79, 51p AID-PN-AAH-768
Contract AID/pha-C01199

Keywords: Access roads, Construction, *Colombia, Communities, Availability, *Marketing, *Roads, Agriculture, Education, Mountains, Rural areas, Developing countries, Developing country application.

Can labor-intensive (pick and shovel) construction of market access roads in the mountainous regions of Colombia result in significant improvements in the welfare of local campesinos. This document assesses the impact of one such effort--The A.I.D.'s Small Farmer Market Access Project. Some 900 km of all-weather, unpaved access roads were planned to link isolated mountain communities with the nearest market road in order to stimulate agricultural production and trade and to open these communities to agricultural extension, health, and educational services. Construction was directed by the host government agency Caminos Vecinales, but as most of the work was performed by the intended beneficiaries, 60-65% of road construction costs were paid as wages to local campesinos. Substantial underestimates of the cost of construction will cause the final total of 59 roads averaging 8 km in length to fall well short of the projected total. Impacts of road construction and road use are discussed in detail. Marginal farmers, the landless, and the unemployed provided the main labor source, using the income gained to make improvements on house and farm, for fertilizer and improved seed, and for purchase of consumer goods. The resulting switch from animal to motorized transportation sharply reduced transport costs, leading to increased agricultural production without changes in policy or agricultural extension services.

PB82-133166 PC A06/MF A01
Practical Concepts, Inc., Washington, DC.
Manager's Guide to Data Collection
Molly Hageboeck, Glynn Cochrane, Lawrence Cooley, and Gerald Hursh-Cesar. Nov 79, 101p AID-PN-AAH-434

Keywords: Information systems, Data acquisition, Data processing, Financing, *Information services, *Management training, Decision making, Methodology, Cost analysis, Developing country application.

Project managers, who rely on data to assist them in decisionmaking, project design, and evaluation, often lack the ability to collect the data themselves and must therefore turn to experts. This report is intended as a guide for managers, enabling them to differentiate between credible and suspect data and to direct all data collection efforts on a timely, cost-effective basis. Four aspects of a manager's role in data collection and analysis are discussed: (1) identifying why, what, and when information is needed; (2) determining the appropriate level of funding and time investments; (3) choosing the most effective information-gathering approach; and (4) managing the data collection and analysis process. For example, a manager faced with a need to fund or replicate a project, or to terminate specific activities, may find he needs baseline information. He must then evaluate the prospective cost of data collection to determine whether the value of the information warrants a lesser, or greater, level of investment. The amount of money or time to be appropriated to the data collection necessarily affects the choice of a collection method, as does the existence of relevant information in Mission or Washington offices or in other resource centers.

PB82-133174 PC A05/MF A01
Agency for International Development, Washington, DC.
Korean Irrigation
Project impact evaluation rept. no. 12
David I. Steinberg, Robert B. Morrow, Ingrid Palmer, and Kim Dong-il. Dec 80, 93p AID-PN-AAH-975

Keywords: *South Korea, *Irrigation, *Agricultural economics, Rice plants, *Rice, Grain crops, Income, Evaluation, Employment, Developing country application, Barley plants.

The irrigation project evaluated in this report was designed to help South Korea become self-sufficient in rice and barley and to raise farm incomes. Fifty-five irrigation works including pumping systems, drainage, reservoir construction, and land reclamation were completed. Rice self-sufficiency was achieved by 1975, soon after the project began. Farm incomes increased.

PB82-133182 PC A05/MF A01
Population Council, New York. Center for Policy Studies.
Population: Current Status and Policy Options
Working paper
Bernard Berelson, W. Parker Mauldin, and Sheldon J. Segal. May 79, 77p WP-44, AID-PN-AAH-324
Contract AID/pha-C-1199

Keywords: Populations, Developing countries, Developed countries, Fertility, *Birth control, Population growth, Forecasting, Policies, Developing country applications, Family planning.

In the past 15 years, the amounts of money, time, and personnel allocated by developed and developing nations alike toward the study and resolution of the problem of overpopulation have increased dramatically. In almost every instance these inputs have been directed toward research, training, and policy measures to reduce fertility. In this paper the authors review actions taken to date, then use their conclusions to make projections for future demographic trends and policy. The authors conclude with an analysis of projected contraceptive technology and various policy options to improve both the supply (via more integrated FP services) and the demand (via increased education and information on FP) for fertility and mortality-reducing programs. Included are appendices on priority donor-recipient countries, changing population rates, and means of fertility regulation and contraception, as well as a 69-item (1962-79) reference list.

PB82-133190 PC A03/MF A01
Population Council, New York. Center for Policy Studies.
Research in Population and Development: Issues and Comment
Working paper
Paul Demeny. May 79, 37p WP-45, AID-PN-AAH-325
Contract AID/pha-C-1199

Keywords: Populations, Developing countries, *Population control, Fertility, Economic analysis, Mortality, Trends, Policies, Developing country application.

The diversity of issues in the field of population and development poses a problem for the researcher, who must decide where and how to allocate his efforts. The following issues are addressed: (1) demographic variables in development policies and plans; (2) disciplinary perspectives on economic demography; and (3) estimating fertility and mortality in developing countries. The author emphasizes the responsibility of each researcher to approach scientific problems with sensitivity to their social significance. The author also suggests that research in economic demography should proceed along two main lines. First, work should be organized around territorially defined populations and should attempt to draw a comprehensive view of past, current, and future trends. Second, policy issues should be defined politically rather than demographically. This would mean that traditional issues such as fertility, mortality, migration, and growth would be replaced by family policy, public health programs, rural development policy, and the like. In his final commentary, the author suggests that demographers not rely

solely on statistics supplied by national governments in formulating policy recommendations. Rather, decentralized statistical information should be used since it corresponds more closely to the reality of how people live, work, and interact.

PB82-133208 PC A03/MF A01
Population Council, New York. Center for Policy Studies.
Population General: Technology and the Social Regulation of Fertility
Working paper
Geoffrey McNicoll. Jun 79, 28p WP-46, AID-PN-AAH-326
Contract AID/pha-C-1199

Keywords: Fertility, *Birth control, Developing countries, Children, Regulations, Foreign technology, Developing country application, Social factors, *Population control.

The 25-year history of efforts by modern national governments to limit high fertility has concentrated solely on biological approaches such as legitimizing and increasing the use of contraceptives and introducing family planning programs. Fertility behavior, however, is at the core of society's economic, cultural, and institutional patterns; therefore; sole reliance on applied biomedical approaches is invariably insufficient. In this paper, the author examines the effects of contemporary patterns of technological and institutional change on fertility and on possibilities for its regulation. He examines the structure of fertility demand, i.e., the desire for a specific (usually rather high) number of children. The author points out that the distribution of fertility costs (loss of the mother's income, costs of raising children, etc.) cannot be separated from the distribution of income and wealth in society; it is society's institutional arrangements that diffuse or concentrate the economic costs of children. Such institutional arrangements include the nuclear family, local communities, and economic classes. As the development effort proceeds, the costs of children are increasingly relegated from larger groupings to the family. Likewise, the power of institutional arrangements to regulate fertility decreases. In addition, nonmedical technologies (e.g., those of transportation, communication and production) continually impact on society's institutions and consequently on fertility behavior. It follows that successful resolution of the world's fertility-related problems will have to go beyond family planning programs and other biomedical techniques to respond to the reality of rapid technological and institutional change faced by developing nations. Footnotes supporting the author's study are appended.

PB82-133216 PC A04/MF A01
Population Council, New York. Center for Policy Studies.
Female Migration in Developing Countries: A Framework for Analysis
Working papers
Veena N. Thadani, and Michael P. Todaro. Aug 79, 53p WP-47, AID-PN-AAH-327
Contract AID/pha-C-1199

Keywords: *Migration, *Women, Females, Developing countries, Rural areas, Urban areas, Marriage, Mathematical models, Developing country application.

Potentially significant gender-related differences in the migratory process suggest the need for a specific analysis of female migration. The emergence of a new category of migrants--unattached women--reveals the inadequacy of existing research approaches which are based on the assumption that female migration reflects patterns of family or household migration. This report uses research conducted in Latin America, Africa, and India to develop a mathematical model of female migration patterns in LDC's. The authors show that where increased economic and/or educational opportunities for women are greater in urban than in rural areas, the increase in female migration rates from countryside to city is marked, and in many cases even greater than male migration levels. The authors argue that two additional variables, mobility marriage (marriage as a means to financial or social improvement) and marital/marriage migration (movement to join or to seek a mate) are particularly important as determinants of the individual woman's propensity to migrate. The authors then introduce a mathematical model to demonstrate that the proportion of women in a given society who choose to migrate is a function of: (1) the differential between expected urban income and average rural income; (2) the probability of marriage to males employed in the modern sector ('mobility marriage' factor); (3) the probability of marriage to any eligible male; (4) sex role constraints on spatial mobility for women, and (5) residual factors such as distance and extended family contacts. The net effect of including the two marriage-related variables in the equation is to find a mathematical basis for the increased female propensity to migrate which has been noted in a number of studies based strictly on economic models.

PB82-133224 PC A05/MF A01
Agency for International Development, Washington, DC.
AID's Role in Indonesian Family Planning: A Case Study with General Lessons for Foreign Assistance
Program evaluation rept no. 2
James R. Heiby, Gayl D. Ness, and Barbara L. K. Pillsbury. Dec 79, 87p AID-PN-AAH-425

Keywords: Project management, *Indonesia, *Birth control, Family relations, Populations, Fertility, Grants, Financing, Foreign countries, Developing country application, Family planning.

The AID-financed family planning program in Indonesia is one of the world's most successful, prompting the question of how to replicate that success in other family planning assistance programs. This report uses data collected from field visits and interviews to evaluate AID's assistance to the Indonesian program and identify the underlying reasons for its success. The report describes the program's service network, its consumers, demographic impact, and AID inputs. A sociocultural study of the country shows that high population growth, administrative support, and community acceptance are the three factors whose convergence most favored the project's success. The history and description of the program, particularly the types and extent of service, are given. AID's support is described in terms of leadership, commodities, organization, resources, local-cost programming method, and interagency linkage.

PB82-133232 PC A14/MF A01
International Center for Research on Women, Washington, DC.
A Preliminary Study in Three Countries: Indonesia Report
Pauline Milone. Sep 78, 306p AID-PN-AAH-417
Grant AID/otr-G-1477

Keywords: Females, *Indonesia, Ethnic groups, Marriage, Education, *Women, *Socioeconomic status, Employment, Children, Literacy, Developing country application.

In Indonesia, a country of over 300 ethnic groups, the enormous diversity of language, religion, education, culture, and custom makes the term Indonesian woman inadequate. This paper documents the social, legal, and economic status of Indonesia's 66 million women without neglecting ethnic differences. The first section describes the country's Islamic, Christian, and commonlaw marriage customs, which impact on every aspect of a woman's existence. The history of Indonesia's women's movement, especially in eliminating child and forced marriages, polygamy, and husband-initiated arbitrary divorce are discussed. This is followed by a portrayal of the difficulties faced by women - particularly the young and/or unmarried - in achieving equal status under the law in regard to child custody, property ownership, control of income, tax liability, access to credit, political participation, and educational opportunities. Also included are the many factors responsible for the high rates of female anemia/malnutrition and maternal mortality, women's communications networks, economic and demographic profiles of women, and the author's impressions of the effects of modernization on women.

PB82-133240 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Lesotho's Employment Challenge: Alternative Scenarios, 1980-2000 AD
Discussion paper
Jerry Eckert, and Ron Wykstra. Dec 79, 30p LASA/DP-7, AID-PN-AAH-330
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: *Employment, *Lesotho, Personnel, Population migration, Males, Females, Trends, Growth, Farms, *Migration, Developing country application, Labor force.

This paper is the second of three closely interrelated research works dealing with one of Lesotho's most important development issues: employment. It considers migrant labor and probable growth in the labor force to arrive at alternative estimates of the total labor supply which must be absorbed by the domestic economy. Subsequently, alternative possible scenarios for labor utilization in non-agricultural sectors are developed, with the intent of deriving the required increase in rural and agricultural jobs as a residual.

PB82-133786 PC A07/MF A01
Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
Evaluation of Low-Cost Extrusion Cooker in Sri Lanka
Special rept.
A. A. Ackels, R. E. Gaylord, and E. E. Kuphal. Jul 77, 132p LEC-3, ID77-78-1, AID-PN-AAH-435

Keywords: Cooking devices, *Food processing, Performance evaluation, *Grains(Food), Developing countries, *Food supply, Foreign technology, Developing country application, *Sri Lanka.

The low-cost extrusion cooker (LEC), a simple system used to convert indigenous grains into low-cost, nutritious foodstuffs, was developed to reduce dependence on food-for-peace programs as a means of solving LDC food supply problems. This paper evaluates the performance of a pilot LEC system in Sri Lanka, determines its suitability for use in other LDC's, and recommends changes and improvements. The investigating team spent 10 days onsite evaluating Sri Lanka's LEC system, which used the Brady Crop Cooker to cook soybeans for farm animal consumption. The evaluation focused on raw materials used, grain cleaning and storage processes, operating and performance of the B.C. and support equipment performance. The team noted improper usage of tools and parts, lack of spare parts, and machines operating with missing or damaged parts. Final recommendations for Sri Lanka LEC are: (1) to investigate and install continuous-duty equipment so that a 98% 120-hr. equipment reliability factor can be reached, (2) to improve LEC maintenance so as to increase production to at least 70% of its maximum production capacity. The authors urge prompt initiation of pilot plant LEC development program to increase world use of the system.

PB82-133794 PC A05/MF A01
Population Council, New York. Center for Policy Studies.
On Allocating Resources for Fertility Reduction in Developing Countries
Working paper
Bernard Berelson, and Robert H. Haveman. Mar 79, 90p WP-40, AID-PN-AAH-322
Contract AID/pha-C-1199

Keywords: Resource allocation, Fertility, Family planning, Effectiveness, Programs, Developing countries, *Birth control, Efficiency, Foreign technology, Developing country application, *Population control, Expenditures.

Population growth in LDC's has led to a yearly allocation of $200 million by donor agencies to programs designed to reduce fertility. In view of expense suprisingly little investigation of resource allocation efficiency has taken place. To determine a superior allocation method, the authors of this paper analyze responses from recognized population planning experts on the effectiveness of current donor funded programs; they also identify the most efficient strategies of intervention by analyzing variations in fertility response according to changes in resource allocation. The paper presents a 108-cell matrix composed of 12 strategies of supply and demand oriented interventions, three social settings (SSs) delineated by favorable responses to fertility interventions and three program implementation (PI) categories describing the strength or weakness of LDC government support. The effectiveness of each cell is rated and the results analyzed. THe most effective strategies are judged to be supply-oriented, specifically faimly planning programs augmented by abortion and/or an unspecified new method. Accord-

ing to the model only 25 of the 108 cells would be effective results in reducing fertility.

PB82-133802 PC A06/MF A01
Agency for International Development, Washington, DC.
Jamaica Feeder Roads: An Evaluation
Project impact evaluation rept. no. 11
Robert J. Berg, Carleen Gardner, Michael M. Horowitz, Palmer Stearns, and Charles Vandervoort. Nov 80, 103p Rept no. AID-PN-AAJ-199
Prepared in cooperation with State Univ. of New York at Binghamton, and Department of Transportation, Washington, DC.

Keywords: Access roads, Planning, Project management, *Roads, Rural areas, *Jamaica, Developing country application.

Although it upgraded a total of 181 miles of rural roads between 1972 and 1976, the Jamaican feeder roads project failed to have any demonstrably significant benefits. This report investigates the causes of that failure by examining the logic, appropriateness, and achievement of the project's goals. The authors conclude that the haste brought about by the project's high political priority ultimately caused its failure. A more methodical design and review process would have revealed the ineffectiveness of the rural roads approach and its propensity for failure. These conclusions are particularly important since politically-oriented foreign assistance from any source could encourage repetition of similar difficulties.

PB82-134552 PC A07/MF A01
Minnesota Univ., Minneapolis. Dept. of Agriculture and Applied Economics.
Risk and Allocative Errors Due to Imperfect Information: The Impact on Wheat Technology in Tunisia
Doctoral thesis
David Fergus Nygaard. Dec 79, 147p AID-PN-AAH-602
Contract AID/ta-BMA-5

Keywords: *Wheat, *Agricultural economics, *Tunisia, Production, Decision making, Mathematical models, Risk, Income, Profits, Policies, Allocations, Errors, Theses, Developing country application.

In the 12 years since high-yield varieties of wheat were introduced in Tunisia, only 15% of all farmers have adopted them. This Ph.D. thesis explains the low adoption rate by analyzing the factors affecting a producer's input decisions (including seed choice), the judgemental errors made in output projections, and the effect of such misjudgements on wheat productivity. The author develops a theoretical model to describe this decisionmaking process. This model incorporates risk and uncertainty variables and notes the difference, or 'allocative error,' between the producer's output expectations - based on input decisions - and the actual outputs.

PB82-135351 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
Surface Dressing in Developing Countries: Research in Kenya
L. S. Hitch. c1981, 43p Rept no. TRRL-LR-1019
Also pub. as ISSN-0305-1293.

Keywords: *Roads, Surface finishing, Bitumens, Aggregates, Binders(Materials), Trafficability, Materials specifications, Seasonal variations, *Kenya, Developing countries, Foreign technology.

In many developing countries surface dressing is used as a running surface on new low-cost roads as well as a maintenance treatment for existing roads. These countries are usually characterized by combinations of road surface condition, traffic, climate, and materials, that are not found in Britain and that are not favorable for good surface dressing. In such cases the recommendations for road surface dressing given in Road Note 39 which is intended for use in Britain, are not applicable. Jackson (1963) has proposed a method of surface dressing design based partly upon ideas put forward by Hanson (1935). This method was used to design a total length of 27 km of experimental sections of surface dressing in Kenya during 1975-77. This report describes the construction, monitoring and performance of the sections during the first 3--4 years trafficking. It is concluded that Jackson's design method works satisfactorily in Kenya conditions over the range of chipping size used in these trials, namely 5 mm to 13 mm average least dimension. (Copyright (c) Crown Copyright 1981.)

PB82-135799 PC A03/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Minibuses and the Public Transport System of Kuala Lumpur
Jamison Mackay. c1981, 35p Rept no. TRRL-SUPPLEMENTARY-678
Also pub. as ISSN-0305-1315.

Keywords: Mass transportation, Developing countries, Urban areas, *Buses(Vehicles), Traffic surveys, *Transportation management, *Malaysia, Public transportation, Kuala Lumpur(Malaysia), Minibuses.

This report is one of a series of studies undertaken by the TRRL, examining public transport in developing countries, and describes the minibus system of Kuala Lumpur, Malaysia's capital and largest city. In 1975 a fleet of minibuses was introduced into the city, operating in competition with the existing stage buses. The operation and service of the minibus system is examined to determine why it has been so successful in attracting passengers away from the conventional stage bus system. While the stage bus is more efficient per unit of capacity, various institutional factors have made the minibus more successful. (Copyright (c) Crown Copyright 1981.)

PB82-135948 PC A04/MF A01
Sri Lanka Univ., Katubedda Campus, Moratuwa.
Analysis of a Shanty Town
K. R. S. Pieris, and C. Doidge. Jul 77, 54p
Sponsored in part by National Science Council of Sri Lanka, Colombo.

Keywords: Housing studies, Urban areas, Tents, *Sri Lanka, Surveys, *Housing, Developing countries, Case studies, Housing planning.

The report presents a case study of a shanty town in Colombo Municipal area. It discusses the growth, land use, house design, household structure, health and education, employment, income of the inhabitants of shanty town.

PB82-135955 PC A04/MF A01
Sri Lanka Univ., Katubedda Campus, Moratuwa.
Future of Shanty Towns
K. R. S. Peiris, and C. Doidge. Apr 78, 63p
Sponsored in part by National Science Council of Sri Lanka, Colombo.

Keywords: Housing studies, Urban areas, Tents, *Sri Lanka, Surveys, *Housing, Developing countries, Housing planning.

The report presents studies carried out in mid 1976 of Shanty towns in Colombo metropolitan areas. It describes various solutions to the shanty problems and makes suggestions about the future of shanty towns. The study also describes the results of survey of houses, household size, housing density, house planning and construction in various shanty towns in Colombo.

PB82-138292 PC A03/MF A01
National Science Council of Sri Lanka, Colombo.
Sun-Drying Methodology: Report of a Seminar, 21 May 1976
1976, 50p

Keywords: Drying, *Food processing, Meetings, *Sri Lanka, *Rice, Solar radiation, *Solar drying, *Fishes, Tea, *Rubber, *Coconuts.

This is a report of a Seminar which dealt with principles and practice of using Sundrying methodology for agriculture and food production. The emphasis has been given to drying of paddy, tea, coconut, rubber, fish.

PB82-138157 PC A06/MF A01
National Science Council of Sri Lanka, Colombo.
Bibliography of Scientific Literature Relating to Sri Lanka: First Supplement
N. A. W. A. T. Alwis. 1979, 116p

Keywords: Research reports, Bibliographies, Geology, Chemistry, Physics, Mathematics, Biology, *Sri Lanka, *Information sources.

The report is the first supplement to a Bibliography of Scientific publications relating to Sri Lanka from 1960-1977. It includes 774 reports. Topics include: Geology, chemistry, physics, mathematics, and biology.

PB82-138165 PC A15/MF A01
National Science Council of Sri Lanka, Colombo.
Bibliography of Scientific Literature on Sri Lanka and by Sri Lankan Scientists Relating to Agriculture, Forestry, Veterinary Sciences and Fisheries, 1960-1978: Volume I
N. A. W. A. T. Alwis. 1979, 340p

Keywords: *Agriculture, Bibliographies, *Forestry, *Information sources, Veterinary medicine, Indexes(Documentation), *Fisheries, *Sri Lanka.

The report covers literature published in Sri Lanka on agriculture, forestry, veterinary science and fisheries during the period 1960-78. It includes 2399 entries with subject index and author index.

PB82-138173 PC A12/MF A01
National Science Council of Sri Lanka, Colombo.
Bibliography of Scientific Literature on Sri Lanka and by Sri Lankan Scientists Relating to Agriculture, Forestry, Veterinary Sciences and Fisheries, 1960-1978: Volume II
N. A. W. A. T. Alwis. 1979, 252p

Keywords: *Agriculture, Bibliographies, *Forestry, *Information sources, Veterinary medicine, Indexes(Documentation), *Fisheries, *Sri Lanka.

The report covers literature published in Sri Lanka on agriculture, forestry, veterinary science and fisheries during the period 1960-78. It includes 5815 entries with subject index and author index.

PB82-140039 PC A03/MF A01
Congreso Nacional de Arquitectos (Panama).
La Condicionante Economica en el Habitat. (Economic Factor in the Habitat).
Rovi Fong, Julio Isaac, and Alvarado Espino. Oct 79, 27p
Text in Spanish.

Keywords: Economic factors, Sociology, *Panama, *Natural resources, Land, Developing countries, Low income groups, Houses, Developing country application.

Departing from the development of Panama, once a forest, owing to the creativity of the people who used the few natural resources they had, the author describes what the people deprived of economic means do, as well as what the companies with them can achieve. The land architecture in Poro-Poro is quoted as an example of what people with low income can do using their resources and some appropriate technologies, such as land, plants, water, winds, level conditions, economical construction systems, utilization of shade, and fish ponds.

PB82-141235 PC A05/MF A01
Centro Nacional de Productividad, San Salvador (El Salvador).
Bio-gas en El Salvador; Especialistas sus Proyector y Grado de Avance. (Bio-gas in El Salvador: Specialist, Projects and Stage of Development).
Moises H. Vides Oliva. Nov 80, 84p
Text in Spanish.

Keywords: Bibliographies, Developing countries, *El Salvador, Manufacturing, *Bioconversion, Design criteria, Industrial plants, Technology, *Fuels, Sources, Substitutes, Foreign technology, Biogas process, Developing country application.

Results from tests on bio-gas production that were carried out at a laboratory level in El Salvador were put into practice for the production of energy in that country, in a project started in June, 1980. This document deals with the projects, either already accomplished or in progress, their locations, technical operations, and basic sources of bio-gas. The bibliography supplied is a combined list provided by each technician in the var-

ious projects. An annex is presented on projects of alternative sources of energy.

PB82-143413 PC A08/MF A01
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Modernization of Irrigation Systems Held at New Delhi on 2-4 April 1979. Volume I
Mar 79, 106p Rept no. PUB-133-VOL-1

Keywords: *Irrigation, *India, Meetings, Irrigation canals, Design, Sprinkler irrigation, Canal linings, Maintenance, Foreign technology.

The report contains 15 papers given for a symposia on 'Modernization of Irrigation Systems in India' held in New Delhi on 2-4 April 1979. Objectives of the irrigation project reports are to provide recommendations to upgrade irrigation canals and improve irrigation efficiency by proper design.

PB82-143421 PC A03/MF A01
Central Board of Irrigation and Power, New Delhi (India).
Proceedings of the Symposium on Modernization of Irrigation Systems Held at New Delhi on 7-9 April 1979. Volume II: General Report and Discussions (Post Session)
Aug 80, 47p Rept no. PUB-133-VOL-2

Keywords: *Irrigation, *India, Meetings, Sprinkler irrigation, Irrigation canals, Irrigation pipes, Drainage, Maintenance, Ground water, Salinity, Water supply, Foreign technology.

A symposium on 'Modernization of Irrigation Systems' was organized by the Central Board of Irrigation and Power during the 49th Board Meeting held in New Delhi from 7-9 April 1979. Sixteen papers were presented and discussed in two Sessions. They relate to one or several of the following principal objectives of rehabilitation of the existing projects: Improvement of reliability of irrigation supplies; increase in irrigation efficiencies and reduction of operation and maintenance costs; maintenance of productivity of land by drainage; prevention of failure of irrigation systems due to physical failure of key structures, like diversion weirs, canal structures, etc.

PB82-143900 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Transport Policies in Sri Lanka and Some Consequences
A. J. Plumbe, and P. G. Hill. c1981, 21p Rept no. TRRL-LR-1008
Also pub. as ISSN-0305-1293.

Keywords: Highway transportation, Policies, *Sri Lanka, *Cargo transportation, Trucks, *Road transportation, Developing countries.

This report describes the repercussions which legislation designed to regulate the economy at large had on the national transport fleet of Sri Lanka. It comments on the lorry population, its distribution between economic sectors, and the relative productivity of each sector in the use of its vehicle fleet. (Copyright (c) Crown Copyright 1981.)

PB82-143918 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
The Role of the Agricultural Tractor in Road Haulage in Sri Lanka
A. J. Plumbe, and H. M. Byrne. c1981, 21p Rept no. TRRL-LR-1007
Also pub. as ISSN-0305-1293.

Keywords: *Cargo transportation, *Agricultural machinery, Tractors, *Sri Lanka, Rural areas, Surveys, Ownership.

The agricultural tractor fills an important role in the freight haulage sector of the Sri Lankan economy. While some machines have been acquired by operators to use exclusively for this purpose, others are employed in this role only when not needed for soil cultivation. The report describes the geographical distribution of ownership, the scale of employment of tractors in this role and shows that before November 1977 road haulage was a profitable business for the owners of machines. After this date when the import of duty was substantially increased the report explains that the position was changed with owners of new machines being unlikely to cover their capital and running costs from revenue. (Copyright (c) Crown Copyright 1981.)

PB82-143926 PC A02/MF A01
Transport and Road Research Lab., Crowthorne (England).
Bullock Cart Haulage in Sri Lanka
A. J. Plumbe, and D. J. Savage. c1981, 23p Rept no. TRRL-LR-1006
Also pub. as ISSN-0305-1293.

Keywords: *Cargo transportation, *Sri Lanka, Rural areas, Surveys, *Animal energy, Developing countries, Bullock carts.

The characteristics of bullock cart haulage are described and the estimated profitability of operating bullock carts based on data collected from surveys conducted in 1977/78. The paper concludes that while the basic design of the bullock cart has changed little over time, and could well be improved, it is easily maintained and well suited to its role in satisfying the demand for goods transport at the most local level and in small unit loads. Details are given of the types and quantities of commodities carried and trip distances, speeds and tariffs are reported. (Copyright (c) Crown Copyright 1981.)

PB82-145350 PC A11/MF A01
Central Board of Irrigation and Power, New Delhi (India).
Labour Intensive Technology in Water Resources Development--Indian Experience
Oct 79, 230p Rept no. PUB-139

Keywords: Professional personnel, *India, *Water resources, Skilled workers, *Irrigation, *Employment, Engineers, *Dams.

India has been bestowed with substantial water resources. The construction of dams and the associated canal systems involving the investment of substantial funds afford an opportunity for providing employment opportunities for a large number of technical, non-technical, skilled and unskilled personnel. This can make a substantial contribution to the reduction in the unemployment situation in the country also in the construction phase. The present publication contains some of the experiences of engineers in the country on adoption of the labor intensive technology on a few water resources development projects.

PB82-145855 PC A04/MF A01
Transportoekonomisk Inst., Oslo (Norway).
Kenya-Sudan Road Link: A Socio-Economic Study. Report I: Alignment - Water Supply - Places of Particular Value
Marit Benterud, Vigdis Broch-Due, Kjell-Torgeir Skjetne, and Frode Storas. Apr 80, 74p Rept no. ISBN-82-7133-307-0

Keywords: *Roads, *Kenya, Social effect, Economic impact, Construction, Boreholes, *Social services, *Sudan, Developing countries.

The report is a socio-economic impact study of the Kenya-Sudan road link from Lodwar to Juba. It deals with local preferences for choice of route and preliminary appraisals for location of boreholes. Some places of particular value to the Turkana are mentioned. These places should not be violated neither by the road nor by its construction.

PB82-147273 PC A04/MF A01
Transportoekonomisk Inst., Oslo (Norway).
Kenya-Sudan Road Link. A Socio-Economic Study, Report 2: Organizing Roadworks - Social Aspects
Dag Bjornland. Dec 80, 58p Rept no. ISBN-82-7133-340-2

Keywords: *Roads, *Kenya, *Sudan, Social effect, Economic impact, Houses, Sanitary engineering, Services, Developing countries, *Social services.

This report is part of a socio-economic impact study of the Kenya-Sudan road link from Lodwar to Juba. It deals particularly with basic needs like the need for houses, sanitary facilities and services, shops, transport, social services for leisure time activities, job training, and the organizing of social activities. Locations of camps for road workers are also suggested.

PB82-147281 PC A03/MF A01
Transportoekonomisk Inst., Oslo (Norway).
Kenya-Sudan Road Link. A Socio-Economic Study, Report 3: The Turkana Road
Inger Johanne Sundby. Jul 81, 45p Rept no. ISBN-82-7133-370-4

Keywords: *Roads, *Kenya, *Sudan, Construction, Developing countries, *Social services.

This report is part of a socio-economic impact study of the Kenya-Sudan road link from Lodwar to Juba. It deals with the background information drawn from the ongoing construction work between Kapenguria and Lodwar. Emphasis is laid on physical structure and social network in the camps along the construction sites.

PB82-151572 PC A06/MF A01
Intermediate Technology Development Group, London (England).
El Tratamiento y Saneamiento del Agua: Manual de Metodos Simples para Areas Rurales de los Paises en Desarrollo. (Water Treatment and Sanitation: A Handbook of Simple Methods for Rural Areas in Developing Countries).
H. T. Mann, and D. Williamson. Jan 76, 111p
Text in Spanish.

Keywords: *Water treatment, *Sewage treatment, Solid waste disposal, Developing countries, Manuals, Water distribution, Rural areas, Filtration, Coagulation, Trickling filters, Disinfection, Potable water, Equipment, Substitutes, Spanish language, Translations, Foreign technology.

The purpose of this handbook is to provide information which must be considered when investigating the development of a water supply and sewage disposal system for a small community which is situated too far from a piped system as water supply. Many of the methods of water and sewage treatment described in this handbook are based on the standard practices used in developing countries but which can be adapted. Chapters 1-6 describe methods which may be applied in sequence, from the selection of a water source, the transport of water, the treatment of water, the disposal of wastes, sewage treatment and the final disposal of treated wastes, and the by-products of treatment processes. In each chapter, a number of alternatives are described, some suitable for self-help situations and others which may be more suitable for larger communities.

PB82-153255 PC A02/MF A01
Planning Commission, New Delhi (India).
Monitoring and Information System for Plan Implementation
C. S. Parthasarathy. 1973, 18p

Keywords: Management information systems, Information systems, Evaluation, Planning, Government, Personnel, Requirements, *Management planning, *Information services, Foreign technology.

There is a distinction drawn between the management function of planning and that of monitoring. Monitoring may usually be looked upon as the process of ensuring that performance takes place in conformity with plans. This would be in sharp contrast to plans which determine the objectives, means, and standards against which performance can be measured. Planning and monitoring, both conceptually and operationally, are inextricably interwoven. The role of information is pervasive in the operations of government. Information is rarely an end in itself; yet information--its availability, relevance, accuracy, timeliness, completeness and presentation format--plays a crucial role in almost every activity of government, namely, in policy-making, planning, decision-making, project/program formulation, implementation, monitoring, and evaluation. Thus, the excellence and effectiveness of government at all levels is, to a considerable extent, based on the quality of its information.

PB82-153750 PC A12/MF A01
Intermediate Technology Publications Ltd., London (England).
El Contratista de Obras de Pequena Escala y el Cliente. (The Small Building Contractor and the Client).
Derek Miles. 1980, 254p
Text in Spanish.

Keywords: Construction management, Contract administration, Contractors, *Small businesses, *Buildings, Bids, Materials estimates, Personnel management, Budgeting, Supervision.

This report deals with the management of the building construction in relation to the various suppliers and persons he will have to contact to get his buildings contracts, as well as bidding to obtain his contracts. Examines the most economical ways to get his materials and budgets considering his costs for the main plant as well as the supervision of the construction site. The management of personnel, samples of letters, bills, meetings, and other managerial aspects of the business such as insurance and the drawing of bids are considered.

PB82-158346 PC A02/MF A01
Agency for International Development, Washington, DC.
Methods of Reducing Postharvest Losses of Roots, Tubers, Fruits, and Vegetables in Developing Country Economies
Robert F. Morris. 11 Jul 78, 20p Rept no. PN-AHH-858

Keywords: *Food processing, *Food storage, Developing countries, Cooling, Refrigerating, *Fruits, *Vegetables, Spacing, Ventilation, Transportation, Food packaging, Developing country application.

The goal of appropriate food technology is to preserve, process, and store food cost-effectively and with minimal loss of produce due to needless and preventable spoilage. This report focuses in various storage and processing methods designed to improve the postharvest production of fruits, roots, tubers, and vegetables. Several food preservation methods were studied including refrigeration, freon, ammonia, and water cooling; atmospheric gas alteration; proper physical spacing and ventilation; and pit storage.

PB82-159070 PC A14/MF A01
Devres, Inc., Washington, DC.
The Socio-Economic Context of Fuelwood Use in Small Rural Communities
Evaluation special study no. 1
Dennis H. Wood, David Brokensha, Alphonso Peter Castro, Matthew S. Gamser, and Beth A. Jackson. Aug 80, 323p AID-PN-AAH-747
Contract AID/SOD/PDC-C-0187

Keywords: Charcoal, *Wood, *Fuels, Developing countries, Project planning, Social effect, Rural areas, Economic impact, Environmental impacts, Allocations, Regulations, Harvesting, Transportation, Allocations, Regulations, Harvesting, Transportation, Developing country application.

All successful community fuelwood programs must take into account the importance of local participation, consider the specific socioeconomic characteristics of the proposed location and its environs, and critically examine alternative plans and approaches. These are some of the major conclusions of this indepth report which examines the socioeconomic and environmental aspects of fuelwood use in developing countries and analyzes critical issues regarding this use.

PB82-159492 PC A04/MF A01
Agency for International Development, Washington, DC.
Philippine Small Scale Irrigation
Project impact evaluation no. 4
David I. Steinberg, Douglas Caton, Susan Holloran, and Thomas Hobgood. May 80, 71p Rept no. AID-PN-AAH-749

Keywords: *Irrigation, *Philippines, Project planning, Income, Production, Economic impact, Social effect, *Water supply, Credit, Developing country application, Cooperatives.

Since 1976, the Philippine Government (GOP), with A.I.D. support, has built or rehabilitated over 1,000 village irrigation systems. This document evaluates the two successive A.I.D. projects which have contributed to this effort. The evaluation begins with a brief description of the projects, in which small, subsistence farmers are encouraged to form cooperative organizations called Irrigators Service Associations (ISA's) in order to gain access to loans and electricity and to construct, operate, and maintain village irrigation systems.

PB82-159526 PC A02/MF A01
International Statistical Inst., Voorburg (Netherlands).
Turkish Fertility Survey, 1978: A Summary of Findings
Jul 80, 23p AID-PN-AAJ-144
Contract AID/csd-3604

Keywords: Fertility, *Turkey, Reproduction(Biology), Interviews, Surveys, Females, *Population control, Developing countries, Population growth, Foreign technology, Developing country application, Females.

From 1945 to 1975, Turkey's population grew at an annual rate of 2.5% until it numbered over 40 million people. Now, however, there are signs that the nation's fertility rate is beginning to decline. This report summarizes the results of the 'Turkish Fertility Survey', which was based on interviews with a representative sample of 4,431 Turkish women. The survey revealed that Turkey has pronounced urban-rural, regional, and social differentials in practically every aspect of fertility investigated, indicating that the nation is in a demographic transition. This report details Turkey's trends toward later marriages, reduced cumulative childbearing, increased knowledge and use of contraceptives, and moderate family size preferences.

PB82-159823 PC A04/MF A01
Agency for International Development, Washington, DC.
Reaching the Rural Poor: Indigenous Health Practitioners Are There Already
Program evaluation discussion paper no. 1
Barbara L. K. Pillsbury. Mar 79, 65p Rept no. AID-PN-AAG-685

Keywords: Medical personnel, Developing countries, Utilization, Attitudes, Rural areas, Low income groups, Policies, Developing country application, *Health manpower, *Health education.

Because over 2.3 billion people worldwide continue to rely on traditional healers and midwives rather than utilize a system they neither understand nor trust, a sensible policy to improve rural health is to encourage and utilize the resources represented by indigenous health workers (IHW's). This paper examines the potential for incorporating IHW's into formal primary health care (PHC) systems to increase community acceptance and improve the utilization of PHC services. The author recommends that A.I.D. follow the World Health Organization's lead in adopting the following policy changes: (1) encourage and support programs which train and utilize IHW's; and (2) focus attention on traditional practices in training professional health workers and in PHC project designs. Specific program guidelines and recommended sector studies conclude the report. Annexes on information needs, a 1977 World Health Assembly resolution, recommendations of a congress sponsored by the Pan American Health Organization, and a 100-item bibliography (1962-79) are included.

PB82-159864 PC A03/MF A01
Oregon State Univ., Corvallis. International Plant Protection Center.
Weed Control Problems in Tanzania: A Review Team Report
S. F. Miller, and L. C. Burrill. 1980, 45p 34-A-80, AID-PN-AAH-969
Contract AID/ta-C-1303

Keywords: *Weed control, Farms, *Tanzania, Herbicides, Cultivation, Flooding, Grasses, Foreign technology, Developing country application, Crop rotation.

The control of weeds, a major problem of both large- and small-scale farmers in Tanzania, is a complex process that can be approached by an array of biological, manual, and mechanical alternatives. This report assesses Tanzanian weed control practices used by seed farms, the National Agricultural and Food Control (NAFCO) farms, selected research institutes, and small farms.

PB82-159872 PC A03/MF A01
Public Health Service, Rockville, MD. Office of International Health.
Perspectives in Maternal-Infant Nutrition
Naomi Baumslag, and Edward Sabin. Sep 78, 29p AID-PN-AAH-710

Keywords: Nutritional deficiency diseases, Infants, Humans, *Children, *Nutrition, Diets, Food, *Women, Maternal health care, Developing country applications, *Health education, Mothers.

Malnutrition is a major contributor to high LDC infant mortality rates. This paper examines the special problem and nutritional needs of those most vulnerable to malnutrition--infants, children, and pregnant and lactating mothers--and recommends specific remedial practices and programs. This report recommends that health personnel strongly encourage the practice of breast-feeding to dispel misconceptions and to ensure better child nutrition. Calorie-protein studies should be instituted and followed by integrated health and nutrition interventions, especially in family planning and mother/child health programs. The mother should be the focus of these efforts as the most cost-effective and enduring means of ensuring the infant's health. Marketing practices and misleading information by formula companies should be minimized. A 28-item bibliography (1966-78) is appended.

PB82-159880 PC A06/MF A01
Agency for International Development, Washington, DC.
Effectiveness and Impact of the CARE/Sierra Leone Rural Penetration Roads Projects
Project impact evaluation rept. no. 7
G. William Anderson. Jun 80, 117p Rept no. AID-PN-AAH-751

Keywords: *Roads, Rural areas, *Sierra Leone, Developing countries, *Agricultural economics, Marketing, Highway transportation, Developing country application.

After years of dependence on declining mineral exports, the Government of Sierra Leone (GOSL) recently shifted its focus to agricultural development. The feeder roads projects reviewed in this report were intended to complement that shift. Project benefits have included more frequent visits by extension agents, increased stops by light vans providing local transportation, increased ownership of motorcycles and bicycles, and greater access to health care. Fertilizer use and marketing of greater varieties and quantities of crops are also more prevalent, and commercial activity (new rural markets, bank lending, new rice mills) has been stimulated. On the negative side, indications are that CARE roads may have precipitated shorter fallow periods for upland rice cultivation, greater rice scarcity, and increased swamp rice cultivation. These factors suggest that food crops are being replaced with cash crops such as cocoa, coffee, and oil palm--and are thus associated with reduced soil fertility, erosion, deforestation, and increased exposure to waterborne diseases. During project implementation, there was a shift from labor-based to equipment-based road construction.

PB82-159914 PC A06/MF A01
Florida Univ., Gainesville.
Handbook for the Collection, Preservation, and Characterization of Tropical Forage Germplasm Resources
G. O. Mott, and Alejandro Jimenez. Jun 79, 114p AID-PN-AAH-937
Grant AID/ta-G-1425
Prepared in cooperation with Centro Internacional de Agricultura Tropical.

Keywords: *Leguminous plants, Forage crops, Plant genetics, Collecting methods, Equipment, *Seeds, Drying, Storage, Germination, Soil properties, Insects, Rhizobiaceas, Handbook, Foreign technology, Developing country application.

This handbook established the procedures for the collection, preservation, and characterization of tropical germ plasm resources. The following steps are out-

lined in individual chapters: preparation for the collection trip; germ plasm collection in the field; description of the collection site; soil sample collection and procedures; collection of Rhizobium strains; and collection and preservation of insects and pathogenic organisms. General and technical equipment needed for a collection trip is discussed, as are basic considerations concerning where and when to look for germ plasms.

PB82-159930 PC A06/MF A01
Agency for International Development, Washington, DC.
Solar Energy Domestic Policy Review International Panel Review of Existing Federal Programs
Sep 78, 115p Rept no. AID-PN-AAH-746

Keywords: *Solar energy, Research projects, Legislation, Foreign countries, Government policies, National government, Reviews, *Energy source development, Developing country application, Energy policy.

This international panel report reviews recent international solar activities of U.S. agencies, especially those of A.I.D., the Department of Energy (DOE), Department of Commerce (DOC), and the International Energy Department Program (IEDP), as well as the major legislative authorities for them.

PB82-160136 PC A02/MF A01
Bangladesh Agricultural Research Inst., Joydebpur.
Effectiveness of Four Rodenticides in Deepwater Rice: Technical Report No. 4
Richard M. Poche, Y. Mian, E. Haque, and F. Sultana. Mar 80, 25p AID-PN-AAH-712
Contract AID/BNG-0003-78

Keywords: Rodenticides, Rodent control, *Bangladesh, Effectiveness, *Rice, Damage, Rats, *Pest control, Zinc inorganic compounds, Phosphorus inorganic compounds, Developing country application, Benzene sulfonic hydrazide, Zinc phosphides, Difenacoum, Brodifacoum.

Over one-half of Bangladesh is flooded each year, causing villages to become small, separated islands infested by rodents driven from the flooded fields. The rodents are a terrible problem for the production of deepwater rice, a major crop in Bangladesh's delta regions, as they raid the crop for food and nest materials. This report was based on a study that identified the rodent species that damage deepwater rice and compared the efficacy of four rodenticides used for their control.

PB82-160144 PC A04/MF A01
Agency for International Development, Washington, DC.
Kitale Maize: The Limits of Success. Project Impact Evaluation No. 2
Charles W. Johnson, Keith M. Byergo, Patrick Fleuret, Emmy Simmons, and Gary Wasserman. Dec 79, 64p Rept no. AID-PN-AAH-723

Keywords: *Corn, Plant genetics, *Kenya, Hybridization, Seeds, Production, Government policies, Economic impact, Developing country application, Maize.

Ninety percent of Kenya's people depend on maize as their staple food. This report examines the impact of A.I.D.'s support to maize breeding projects in Kenya, which aimed to make regular improvements in hybrid maize through development of a breeding methodology and to create an institutional capacity in East Africa for maize research. The evaluation is particularly concerned with the spread of improved hybrid technology and its impact on economic growth, equity, and government policy.

PB82-160151 PC A05/MF A01
Agency for International Development, Washington, DC.
Rural Electrification: Linkages and Justifications. Program Evaluation Discussion Paper No. 3
Judith Tendler. Apr 79, 84p Rept no. AID-PN-AAG-671

Keywords: Electric power distribution, Rural areas, Evaluation, Projects, *Electric power, *Community development, Developing country application.

The author notes that rural electrification planners generally tend to seek replication of the successful Philippine rural electrification(RE) project, which strongly favored household consumption. The author concludes that an RE project is not justified on the basis of household consumption alone; most often the poorest members of the community cannot take advantage of the benefits offered by household electricity. They can benefit much more significantly from the increase in employment which accompanies RE use by producers and from the increase in public services resulting from RE's municipal use. A.I.D. should investigate means of encouraging employment generation in RE projects, e.g., by providing credit and technical assistance to small industries. A.I.D. should also identify public services which are electricity-dependent, such as clinics and schools, and link provision of RE projects with extension of these services. The author also recommends the creation of a central A.I.D. office to promote local(rather than international) suppliers for the equipment and labor demands of infrastructure projects and favors an AID-supported central fund to promote local cooperatives and auto-generation projects. A 94-item bibliography (1966-78) is included.

PB82-160169 PC A05/MF A01
Overseas Education Fund of the League of Women Voters, Washington, DC.
Child Care Needs of Low Income Mothers in Less Developed Countries: A Summary Report of Research in Six Countries in Asia and Latin America
Sep 79, 90p AID-PN-AAH-982
Contract AID/ta-G-1413

Keywords: Day care centers, Developing countries, Females, *Children, Income, *Health, Requirements, *Women, Vocational guidance, Developing country application, Labor force.

The need to expand women's roles to include contribution to household finances in addition to caring for a family is impaired by the lack of options for child care available to women. This report summarizes studies conducted on the effect of women's income-generating activities on child care patterns, health, nutrition, and alternative approaches to child care in six developing countries--Korea, Malaysia, Sri Lanka, Brazil, Dominican Republic, and Peru. The report recommends that national and international agencies make child care and women's needs a priority.

PB82-160177 PC A07/MF A01
International Potato Center, Lima (Peru).
International Potato Center, Lima, Peru, Annual Report, 1979
Jul 80, 148p AID-PN-AAH-951
Contract AID/ta-G-1181

Keywords: Growth, *Potatoes, *Peru, Seeds, Plant diseases, Insects, Nematoda, Pest control, Developing country application.

New methods and advances in potato and other agricultural technology have been developed far more rapidly than national programs can absorb and communicate them to the growers. This annual report documents the efforts and successes of the International Potato Center in 1979 and urges a marked increase in funding and development of research and extension programs in the 1980's. Problems and progress in each of the nine major thrusts of CIP research are examined in detail.

PB82-160185 PC A02/MF A01
International Statistical Inst., Voorburg (Netherlands).
The Kenya Fertility Survey, 1978: A Summary of Findings
1980, 20p AID-PN-AAJ-146
Contract AID/csd-3606

Keywords: Fertility, *Kenya, Reproduction(Biology), Interviews, Surveys, Females, Developing countries, Population growth, *Birth control, *Population control, Foreign technology, Developing country application, Females.

At its current annual population growth rate of 4%, Kenya's population of about 15.3 million people will double in 18 years. This International Statistical Institute (ISI) survey report assesses factors contributing to Kenya's growth rate: the strength of marriage, high fertility rates, preference for larger families, limited contraceptive usage, and the slight effect of noncontraceptive factors upon fertility. From 8/77 to 5/78, ISI interviewed 8,100 single and married women from 8,891 households. ISI's most important discovery was Kenya's extremely high fertility rate, an average of eight children per woman. Of these, an average of 6.3 survive--with only 2.5 children required for a balanced population level. Additional data suggest an increase in population fertility over the past 15 years. Responses to questions about preferred family size indicate that Kenya has a very pronatalist culture. Most women wanted large families and only a few, including those who already had six children, wished to have no more. Although 88% of the women (in all categories) had heard of at least one contraceptive method, only 29% had tried one and only 11% had used a modern one.

PB82-160193 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Manpower versus Machinery: A Case Study of Conservation Works in Lesotho
Research rept. no. 6
Ron Wykstra, and Jerry Eckert. Apr 80, 31p LASA/RR-6, AID-PN-AAH-742
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Labor estimates, Capitalized costs, Public works, Conservation, Civil engineering, *Productivity, Cost estimates, Capital, Fixed investment, Construction costs, *Employment, *Lesotho, Job creation, Developing country application.

This paper propounds the use of labor-intensive over capital-intensive methods in conservation and other public works as a way of providing domestic employment--an argument supported by extensive cost-benefit comparisons and analyses of both methods. Using the results of an earlier analysis as augmented by new data on labor productivity and increased fuel prices, this paper clearly demonstrates that a program of labor-intensive public works is a viable strategy for further developing Lesotho's infrastructure, as well as for contributing significantly to its employment objectives. An 8-page appendix detailing the underlying cost analysis, as well as extensive tables and equations, are provided in support of the authors' conclusions.

PB82-160201 PC A14/MF A01
Agency for International Development, Washington, DC.
Proceedings of the USAID/ASIA Bureau Conference on Energy, Forestry and Environment Held in Manila, November 12-16, 1979
1979, 317p Rept no. AID-PN-AAH-942

Keywords: Meetings, India, Nepal, Philippines, Thailand, Indonesia, Sri Lanka, Bangladesh, *Asia, *Forestry, *Environmental impacts, Planning, *Energy source development, Developing country application.

In response to increasing energy needs among Asian countries, a USAID Asia Bureau Conference was held in Manila, November 12-16, 1979, on energy problems and policies in Asia and their related forestry and environmental aspects. This report contains the proceedings of that Conference. The specific purpose of the Conference, which was attended by energy experts, host country specialists, A.I.D. and USAID officials, and donor agency representatives, was to make preliminary recommendations for A.I.D. assistance to Asian countries in ameliorating their energy problems. Conference presentations, to which brief bibliographies are included, were of three types: papers presenting overviews of major issues, papers analyzing current energy planning, and A.I.D. country background papers. The role of energy in development was addressed from international, national, regional, functional, and sectoral perspectives. Workshop discussion groups examined the energy situation and program options in India, Nepal, Philippines, Thailand, Indonesia, Sri Lanka, and Bangladesh and the possible A.I.D. roles supporting energy interventions in these countries.

PB82-160219 PC A04/MF A01
Agency for International Development, Washington, DC.
Impact of Rural Roads in Liberia
Project impact evaluation rept. no. 6
Richard Cobb, Robert Hunt, Charles Vandervoort, Caroline Bledsoe, and Robert McClusky. Jun 80, 63p Rept no. AID-PN-AAH-750

Keywords: *Roads, Rural areas, *Liberia, Evaluation, Economic impact, Social effect, Agriculture, Developing countries, Developing country application.

Since the construction in Liberia of four all-weather rural roads, some villagers of the Lofa, Nimba, and Grand Jide counties enjoy increased accessibility to markets, schools, and health clinics. In order to assess who the actual beneficiaries were and how they benefited, a five-person evaluation team was set up. It was found that the roads were economically justified in terms of the volume of passenger and cargo traffic. It was also found that the roads have had a mixed impact. Improved transportation has bettered educational opportunities for children of tribal communities, stimulated the cultivation of the cash crops of coffee, cocoa, and rubber; and reduced not only produce loss due to spoilage but also cargo costs of agricultural products by 90% in more isolated areas. Perhaps the most serious, long-term impact which negates these short-term benefits is the change in the land tenure and use system.

PB82-160227 PC A05/MF A01
Auburn Univ., AL. International Center for Aquaculture.
Review of Aquaculture Development Activities in Central and West Africa
John H. Grover, Donald R. Street, and Paul D. Starr. 1979, 100p AID-PN-AAH-936
Contract AID/DSAN-C-0053

Keywords: *Aquaculture, *West Africa, Acceptability, Education, Economic development, Water supply, Climate, Rural areas, Developing country application.

Fish farming is not widely practiced in Central and West Africa despite promotion efforts dating back to the 1940's, the acceptance of fish as a food by the vast majority of people, and the availability of suitable lands. The purpose of this study is to assess the reasons why these efforts have not had more impact and to suggest improvements. It is concluded that aquaculture has the potential to provide both food and income for rural village dwellers.

PB82-160235 PC A04/MF A01
Agency for International Development, Washington, DC.
Women in Forestry for Local Community Development: A Programming Guide
Marilyn W Hoskins. Sep 79, 65p Rept no. AID-PN-AAH-678

Keywords: *Forestry, Females, Developing countries, Wood, Utilization, *Community development, Models, Foreign technology, Developing country application, *Women.

To deal effectively with local forestry problems in developing countries, it is necessary to focus on the group using forest products the most: the women whose principal chores are centered around wood. This report explores the problems and issues related to women's participation in forestry. Women's roles in forestry development include the important taks of gathering fuelwood and obtaining food and medicine from trees. Women are more likely to participate in projects that expand upon familiar activities, especially if women have direct control over, and benefit from, the project. Two models for forestry programming are proposed. The first model, the integrated approach, involves a project design directly suited to the needs of a particular community. The second model entails designing the forestry project first and then finding a community which could benefit from this type of project. Community responsibilities toward forestry projects include agreeing upon long- and short-range goals; plans for integrated resource use; a maintenance plan; projected benefits; and an evaluation plan.

PB82-160847 PC A04/MF A01
Population Council, New York.
Rural Development and Fertility Transition in South Asia: The Case for a Broad-Based Strategy
Samuel S. Lieberman. 1980, 58p AID-PN-AAH-950
Contract AID/pha-C-1199

Keywords: Rural areas, *Population control, *Asia, Developing countries, Fertility, *Employment, Japan, Models, Developing country application.

A point of contention for many population planning and development experts is the relationship, if any, between rural development programs and fertility--how can the two be integrated to simultaneously achieve gains in employment and output while reducing fertility. This paper addresses this issue by examining a broad-based strategy of agricultural development inspired by the Japanese experience and by discussing the applicability of that strategy to South Asia in general. The author discusses the limited applicability of the Japanese model in the South Asia situation because of differences in the political, economic, and agricultural structures between the two regions. Finally, two alternative broad-based strategies are presented; their major departure from the Japanese model is that a much more extensive scope of government involvement in development policy is envisioned. The two strategies, integrated rural development and guaranteed employment, are explained and their possibilities for the South Asia context are discused. The report concludes with supporting footnotes and a 156-item reference list (1951-79).

PB82-160854 PC A03/MF A01
Agency for International Development, Washington, DC.
Water Resource Development in India: Issues, Problems, and Prospects
Gary S. Posz, and Dean F. Peterson. Jun 80, 36p Rept no. AID-PN-AAH-968

Keywords: *Water resources, *Irrigation, *India, Construction, Improvement, Water distribution, Rainfall, Cost analysis, Ground water, Droughts, Development country application.

This report provides a current account of water resources development in India, with particular emphasis on irrigation and agricultural production. Although irrigation development is a priority of the Government (GOI), the nation's existing irrigation systems are inefficiently managed. The remedy is increased construction and improved operation of distribution channels.

PB82-160862 PC A04/MF A01
Florida Univ., Gainesville.
Lethal Yellowing Disease of Coconut in Jamaica
Fred M. Eskafi. Aug 79, 56p AID-PN-AAH-743
Contract AID/ta-C-1386

Keywords: Trees(Plants), *Plant diseases, Insects, Discoloration, Plant tissues, Isotopic labeling, Radioactive isotopes, Disease vectors, Mites, Field tests, *Jamaica, Florida, Developing country application, *Coconuts.

The purpose of the present research study was to identify species of occasional palm-feeding insects present on coconuts in Jamaica for comparison with results obtained in Florida and to test the vector status of selected species. Past studies have suggested that wilting in the coconut palm is caused by xylem blockage at a point below the growing point. In the present study, researchers used radioisotope P to study the phenomena in more detail.

PB82-160888 PC A02/MF A01
Agency for International Development, Washington, DC.
Fruit, Vegetables, Roots and Tubers in the Developing Economies: An Estimation of Losses
Robert F. Morris. 25 May 78, 17p Rept no. AID-PN-AAH-859

Keywords: *Fruits, *Vegetables, *Food storage, Food deterioration, Losses, Damage, Respiration, Temperature, Tuber crops, Root crops, Insects, Developing country application.

The report discusses the damages occurring to fruits, vegetables, roots, tubers (called 'perishables') and the problems of estimating associated losses. Physiological, pathological or physical losses are discussed in detail. At a conservative estimate, some 25% of perishables produced are lost annually, indicating a need for effective international action.

PB82-160896 PC A03/MF A01
Oregon State Univ., Corvallis. International Plant Protection Center.
Knapsack Sprayers: Use, Maintenance, and Accessories
Frank Fraser, and Larry C. Burrill. Nov 79, 36p 29-A-79, AID-PN-AAH-730
Contract AID/ta-C-1295

Keywords: *Pesticides, *Sprayers, Volume, Spray nozzles, Cleaning, Maintenance, Calibrating, *Agricultural machinery, Developing country application, Knapsack sprayers.

This report assesses the factors to be considered in determining which sprayer is best suited for any particular task. These factors are the sprayer's size, availability, cost, and the user's personal preference. The authors begin by contrasting knapsack sprayers with hand-held sprayers. The typical knapsack sprayer requires continuous hand pumping, but can handle more liquid with greater user comfort and bigger jobs.

PB82-160920 PC A05/MF A01
Agency for International Development, Washington, DC.
The Potable Water Project in Rural Thailand
Project impact evaluation rept. no. 3
Daniel M. Dworkin, and Barbara L. K. Pillsbury. May 80, 85p Rept no. AID-PN-AAH-850

Keywords: *Water treatment, *Water supply, Rural areas, *Thailand, Potable water, Economic impact, Social effect, Environmental impacts, Public health, Foreign technology, Developing country application.

The greatest impact of the Potable Water Project in Thailand was not health-related, but occurred in the form of economic benefits such as increased gardening, livestock raising, and crafts production. After brief sections on health sector background and on project objectives and implementation, the effectiveness of the project is considered.

PB82-160946 PC A03/MF A01
Fish and Wildlife Service, Denver, CO. International Programs Section.
Rodents in Tropical Rice
Michael W. Fall. 1977, 46 TB-36, AID-PN-AAG-825
Contract AID/tab-473-1-67
Sponsored in part by National Economic and Development Authority, Manila(Philippines).

Keywords: Rats, *Pest control, *Southeast Asia, *Rice, Flooding, Traps, Repellents, Poisons, Plant genetics, Developing country application, Predators.

This report provides agricultural technicians working in the tropics with a summary of information on rodent-associated rice problems and major rat control methods used in Southeast Asia--particularly the Philippines.

PB82-160961 PC A03/MF A01
Agency for International Development, Washington, DC.
Rural Water Projects in Tanzania: Technical, Social, and Administrative Issues. Evaluation Special Study No. 3
Daniel Dworkin. Nov 80, 36p Rept no. AID-PN-AAH-974

Keywords: Water distribution, *Water supply, *Tanzania, Operating costs, Rural areas, Water wells, Pumps, Reliability, Developing country application.

For this evaluation of A.I.D.'s rural water projects in Tanzania, a survey was conducted of 20 Tanzanian villages whose completed water systems used the four major technologies available for dry, wet, and mixed regions. Three major results from this survey are presented in this report. It was found that of the types of water systems surveyed, handpumps represented the most appropriate technology due to their greater reliability and lower capital and operating costs. Shallow wells were also labor-intensive and the use of local construction and maintenance materials increased employment.

PB82-161050 PC A05/MF A01
National Swedish Inst. for Building Research, Stockholm.
Upgrading in Lusaka: Participation and Physical Changes
Carole Rakodi, and Ann Schlyter. 1981, 82p Rept no. ISBN-91-540-3607-0

Keywords: *Housing, Developing countries, Regional planning, Residential buildings, Upgrading, Land use, Schools, *Zambia, Foreign technology.

Upgrading of squatter settlements was introduced as a policy in several African countries during the early seventies. A steadily increasing rate of the population in the rapidly growing cities was living in squatter settlements. Site and services schemes as well as low cost housing projects had failed to contribute to the housing of the poor. The squatter settlements reached such dimensions that the environmental problems had to be recognized. International organizations such as the World Bank began to support upgrading project by giving loans. One of the first large projects of this kind was carried out in Lusaka, Zambia. The Lusaka Housing Project is the common theme for the two separate articles in this volume. The first one concentrates on the physical aspects, discussing to what extent the physical changes are a real improvement of the environment of the inhabitants, while the second article analyzes the inhabitants' role in the implementation of the project.

PB82-161357 PC A03/MF A01
Agency for International Development, Washington, DC.
Study of Family Planning Program Effectiveness
Program evaluation discussion paper no. 5
Steven W. Sinding. Apr 79, 29p Rept no. AID-PN-AAG-672

Keywords: *Birth control, Developing countries, Populations, Fertility, Control, Government policies, Health, Females, Employment, Education, Developing country application, Family planning.

It is generally accepted by population experts that a decline in fertility rates depends upon the interrelationship between the supply of family planning (FP) programs, determined by a government's political commitment and its administrative capability, and the demand for FP services, determined by the acceptability and adoption of the small family norm. This paper analyzes the results of a review of the literature on the relation of demand and supply determinants to FP effectiveness; it also develops guidelines to determine the conditions under which a major FP action is appropriate. The paper's major conclusion is that political will and administrative capability alone cannot overcome basic sociocultural obstacles unless direct government action on reproductive behavior is an important feature of the program. Recommendations for specific countries conclude the paper.

PB82-161597 PC A07/MF A01
Agency for International Development, Washington, DC.
Proceedings of Joint Research Committee Workshop on the Collaborative Research Support Programs Held at Washington, DC. on June 9-10, 1980
Glenn Beck, and Jonellen Goddard. 1980, 128p Rept no. AID-PN-AAH-949

Keywords: Research management, Developing countries, Meetings, Financing, Universities, *Food supply, *Technical assistance, Developing country application.

The Collaborative Research Support Program (CRSP) concept was designed in response to the Title XII Amendment to the International Development and Food Assistance Act of 1975 calling for 'program support for long-term collaborative university research on food production, distribution, storage, marketing, and consumption.' In order to improve and strengthen the processes leading to the execution of future CRSP activities, a Joint Research Committee (JRC) Workshop on CRSP's was organized to review and evaluate CRSP expriences in planning, management, and early implementation. This document contains workshop papers discussing such experiences and expressing the insight gained by the JRC, A.I.D., and participating universities into some of the problems and successes of CRSP's. Issues covered in the plenary session on planning included conducting exploratory studies in order to describe problems, to recommend to the JRC potential research approaches (including CRSP's), and to assist the JRC in establishing priorities; mission involvement in CRSP's; university selection and contracting procedures; and administration of business arising between regular JRC meetings.

PB82-161605 PC A07/MF A01
Experience, Inc., Minneapolis, MN.
Irrigated Agriculture in Afghanistan
Dec 78, 136p AID-PN-AAH-668
Contract AID/afr-C-1130

Keywords: *Irrigation, *Afghanistan, Surface waters, Ground water, Soil properties, Water conservation, Constraints, Water storage, Reservoirs, Developing country application.

Agriculture in Afghanistan, particularly small-farmer agriculture is hampered by inadequate irrigation systems and inappropriate use of water and land resources. This study identifies three main problem areas inhibiting development of irrigated agriculture in Afghanistan and proposes possible solutions.

PB82-161613 PC A14/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Rice Improvement in China and Other Asian Countries; Proceedings of the International Rice Research Workshop (1st), Guangzhou, China, 1979
1980, 314p AID-PN-AAJ-141
Contract AID-492-1310-T
Prepared in cooperation with Chinese Academy of Agricultural Sciences, Beijing.

Keywords: Plant growth, *Rice, Plant genetics, Meetings, Tolerances(Physiology), *Plant diseases, *Pest control, *Irrigation, *Soils, *Fertilizers, Fungus diseases, Viruses, *China, *India, Asia, Developing country application.

This report is a collection of 21 papers presented at the International Rice Research Institute (IRRI) Workshop concerning Asian rice production, with particular attention directed to the People's Republic of China--the world's largest producer and consumer of rice--and India. Emphasis was placed on breeding rice varieties with genetic resistance to insects and diseases and developing cultural practices to enable farmers to control pests without costly chemical applications.

PB82-161712 PC A03/MF A01
Direccion General de Recursos Pesqueros, San Salvador (El Salvador).
Manual for Fish Cultivation in Floating Cages in Natural and Artificial Reservoirs (Manual para el Cultivo de Peces en Jaulas Flotantes en Reservorios Naturales y Artificiales)
Jose Francisco Godinez-Gonzalez. Aug 81, 44p
Text in Spanish.

Keywords: *Fishes, *Aquaculture, *Reservoirs, Manuals, *Cage culture, Design, Life cycles, Diets, Drying, Marketing, Developing country application, Cages.

This report guides any person interested in growing fish in floating cages, by explaining and illustrating the techniques used by the author during four years, and the results obtained. Emphasis is placed on the description of the cages, how to site them, the life cycle of the fish, their feeding, processing and drying, marketing, and economic aspects.

PB82-162058 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
The Future of Basotho Migration to the Republic of South Africa
Research rept. no. 4
Jerry Eckert, and Ron Wykstra. Sep 79, 31p LASA RR-4, AID-PN-AAH-103
Contract AID/afr-C-1387
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Population migrations, Developing countries, *Employment, Income, *South Africa, Mining, Unemployment, *Migration, Migrants.

The paper analyzes demographic, economic, social, and political factors affecting the future of Basotho migratory labor in the Republic of South Africa, predicts the magnitude and timing of changes that may be expected, and considers the implications of such changes for Lesotho. Migrant opportunities are likely to decline substantially during the next two decades, due to chronic domestic unemployment in South Africa and changing trends in gold and coal mining production. Studies indicate that the South African labor force will increase annually well in excess of employment rates needed to absorb this growing force. This situation will result in a displacement of 0.5 million foreign migrant laborers, 47% of which are Basotho. This study asserts that the reality of displacement is beginning to appear. However, because the Government of South Africa and mining industries are aware of the consequences that a sharp reduction in the Basotho labor force will have, a gradual reduction with advance notice is predicted. Further, most of the adjustments will occur during the 1980s, probably resulting in a 50% reduction of currently employed Basotho by the year 2000. The study continues to cite economic and social implications of this reduction for Lesotho: requirements for job generation; maldistribution of income; a decline in the gross national product; and a decrease in imported products providing a source of additional revenue.

PB82-162074 PC A11/MF A01
Sogang Univ., Seoul (Republic of Korea). Research Inst. for Economics and Business.
A Study on the Demand and Market Development of Low Cost Nutritious Bread in Korea
Il-Chung Whang and Sung Hwan Jo. Feb 78, 236p AID-PN-AAG-792
Contract AID-489-2-75-T

Keywords: Market research, *South Korea, Bread, Demand(Economics), Bakery products, *Food products, Food consumption, Sales, Attitudes, Consumers, Developing country application.

In 1975, under USAID financial sponsorship, Sam Lip Foods Co., Ltd., one of Korea's largest bread manufacturers, began production of soy-fortified bread. This study analyzes and evaluates findings from a subsequent survey of consumer attitudes and sales in a test marketing of the product.

PB82-162363 PC A06/MF A01
Agency for International Development, Washington, DC.
The Sociology of Pastoralism and African Livestock Projects
Program evaluation discussion paper no. 6
Michael M. Horowitz. May 79, 118p Rept no. AID-PN-AAG-992

Keywords: Livestock, *West Africa, Project planning, Social effect, *Animal husbandry, Semiarid land, Management, Evaluation, Constraints, Land use, Water supply, Developing country application, Desertification.

This paper analyzes the sociological and ecological assumptions which underlie A.I.D. interventions in the West African livestock sector. Against a background portrait of the African herdsman, A.I.D. sector interventions in the region are identified and critically reviewed in terms of the problems of desertification and mixed farming, range tenure, pastoral offtake, mobility, herd management, and the role of women.

PB82-162975 PC A03/MF A01
Economic Research Service, Washington, DC. Natural Resource Economics Div.
Land Resource and Land Use Classification Concepts and Methods
Staff rept.
Jon Putman, Kenneth Ackerson, and Scott Witter. Jan 82, 37p Rept no. AGES-820111

Keywords: *Land use, *Agriculture, Classifications, Climate, Soils, Geography, Policies, Soil analysis, Developing countries, CRIES project.

This report documents the concepts and methods used by the Comprehensive Resource Inventory and Evaluation System (CRIES) Project to classify and evaluate land for national planning and policy analysis. The classification system uses two components -- soil and climate -- as the basis for delineating broad, relatively homogeneous geographic areas and to identify and tabulate major landscapes within these areas. The system is designed to provide geographic identity and soil detail suitable for national planning and analysis at minimum cost.

PB82-164120 PC A06/MF A01
Agency for International Development, Washington DC.

Assessing the Impact of Development Projects on Women
Program evaluation discussion paper no. 8
Ruth B. Dixon. May 80, 125p Rept no. PN-AAH-725

Keywords: Projects, Females, *Employment, Specialized training, Objectives, Personnel development, *Women, Developing country application.

The current methodology for evaluating development projects - even women-specific projects - concentrates on logistical questions of timing and supplies rather than on social impact questions and is therefore inadequate to assess a project's impact on women. In order to develop a new evaluative framework which addresses these inadequacies, this study reviews evaluations of 32 A.I.D. and private voluntary organization women-specific projects. The evaluations only indirectly assess women's concerns but provide sufficient information to analyze the success of projects in meeting three basic goals for women-in-development projects: (1) participation in project decisionmaking; (2) access to immediate project benefits; and (3) improvement in socioeconomic status. Specific factors which contribute to the achievement of these three goals are identified.

PB82-164138 PC A06/MF A01
Nathan (Robert R.) Associates, Inc., Washington, DC.
Equitable Growth: The Case of Costa Rica
Case studies in development assistance no. 6
Phillip W. Rourk. 1979, 102p AID-PN-AAH-868
Contract AID/otr-C-1380

Keywords: Economic development, *Costa Rica, Developing countries, *Employment, Growth, *Socioeconomic status, Developing country application.

Increased concern with equity objectives of development--employment, equality, participation, meeting basic needs--has prompted the search for cases of successful equitable growth. Costa Rica, whose growth is analyzed in this report, represents an example where a rising GNP has been maintained along with an equitable distribution of benefits. The report begins by presenting a brief overview of Costa Rica's growth and of the historical components, i.e., the physical setting, colonial influences, economic developments, and political changes, which have been responsible for its current socioeconomic condition. Public sector programs developed between 1960 and the early 1970's are treated next, including the development of physical infrastructure such as roads, electricity, and housing; human resources, including education, health care, family allowances, and nutrition; and land reform and wages policy. Issues and alternatives for equitable growth are treated in a concluding chapter.

PB82-164393 PC A03/MF A01
Agency for International Development, Washington, DC.
Kenya Rural Water Supply: Programs, Progress, Prospects
Project impact evaluation rept. no. 5
Daniel Dworkin. Jun 80, 50p Rept no. PN-AAH-724

Keywords: *Kenya, *Water supply, Rural areas, Ground water, Recommendations, Developing countries, Developing country application.

Despite high levels of investment, Kenya's 10-year old water supply program has been unable to build successful water supply systems in rural areas; even as new systems are built, the number of inoperative systems increases. This paper evaluates the impact of the national program and the reasons behind its failure and makes policy recommendations for future A.I.D. water supply projects.

PB82-164401 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Rainfall Oscillations in Lesotho and the Possible Impact of Drought in the 1980s
Discussion paper
Jerry Eckert. Aug 80, 28p LASA/DP-10, AID-PN-AAH-923
Grant AID/ta-BMA-6
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Rainfall, *Agriculture, *Lesotho, *Drought, Corn plants, Wheat plants, Water conservation, *Meteorology, Seeds, South Africa, Developing country application.

Scientific research from the last several years has confirmed that rainfall over much of southern Africa follows a pattern of regularly spaced wet and dry spells of 9-10 years each in length. This report examines the findings mentioned and finds that Lesotho is now coming to the end of an above-normal rainfall period and if the 'quasi 20 year oscillation' continues will average below normal from 1982-1990. Such a dry spell may affect both maize and wheat production severely. The report points out that the Ministry of Agriculture should take the following steps to minimize the effects of the predicted dry spell during the 1980's: conduct research to improve farmer management of soil-plant-water interactions; give priority to water conservation programs; utilize the government seed importation capacity to obtain and spread seeds of drought-resistant varieties.

PB82-164633 PC A10/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Proceedings of the International Workshop on Energy Survey Methodologies for Developing Countries Held at Jekyll Island, Georgia on January 21-25, 1980
1980, 222p* AID-PN-AAH-940
Grant AID-DSAN-G-0190

Keywords: Developing countries, Meetings, Bangladesh, Jamaica, Kenya, Philippines, Burundi, *Energy, Cameroon, Rural areas, Urban areas, Energy demand, Developing country application, Transportation sector, Industrial sector, Energy consumption.

The inadequacy of current information on escalating LDC energy consumption prompted the National Academy of Sciences to hold an international workshop in January 1980 to review existing surveys of energy consumption and potential demand in LDC's. Proceedings of that workshop are provided in this report. Working group reports on LDC energy needs in urban, rural, transportation, and industrial settings are presented, along with excerpts from 12 energy-related LDC studies and abstracts of 55 studies on energy assessments, energy survey design, and data analysis systems.

PB82-164856 PC A05/MF A01
Tanzania Industrial Studies and Consulting Organisation, Dar es Salaam.
A Handbook for the Promotion of Industrial Projects
C. D. Msuya. Dec 79, 93p

Keywords: Economic development, *Tanzania, Government policies, Handbooks, Investments, *Industrial development, Developing country application.

This Handbook is intended to shed some light upon existing regulations and practices related to the initiation of new projects in industry in Tanzania. By clarifying the basic economic and industrial development policy of the Government, it is hoped that in situations where clear guidelines might be lacking--or even on occasion existing rules or recommendations might appear conflicting--this Handbook will enable both investors and officials to act in accordance with the overall basic strategy for industrial development in Tanzania.

PB82-164864 PC A04/MF A01
Tanzania Industrial Studies and Consulting Organisation, Dar es Salaam.
A Manual for Investors in Tanzania
C. D. Msuya. 1980, 53p

Keywords: *Tanzania, Investments, Manuals, Government policies, *Industrial development, Incentives, *Foreign investments, Developing country application.

This manual is intended to inform potential investors as factually as possible about investment opportunities and conditions in Tanzania. It describes what investment opportunities exist, how to develop them and where further useful information may be obtained. The main purposes of the Manual are: to assist the Government in reviewing investment possibilities and in considering the scope for investment by various parties; to introduce to the prospective foreign investor the economy of Tanzania and particularly its industrial sector; to guide the investor on the opportunities for investment, and to define for the investor those areas of industrial investment which are reserved for the Government and those which are open to other bodies either by themselves or in co-operation with government; to inform the investor on investment procedures and incentives offered by the Government in order to promote industrial development in Tanzania.

PB82-164997 PC A04/MF A01
Department of Industries, Cape Town (South Africa). Sea Fisheries Branch.
Sea Fisheries Panorama: Information on South and South West African Marine Fisheries and Their Management
1978, 67p

Keywords: *Fisheries, *South Africa, Research projects, Crustacea, Mollusca, Marine fishes, Whales, Sea grasses, Marine biology, Plankton, Developing country application.

This booklet mainly provides information about the fishery industry in the Republic of South Africa and the research works being done. The booklet describes the pelagic fishery, demersal fishery, crustacean fisheries, mollusc fisheries, line fisheries, the marine mammal industry, and the seaweed industry.

PB82-165002 PC A06/MF A01
National Inst. of Nutrition, Hyderabad (India).
Food and Health
K. Srilakshmi, B. V. Rama Sastri, and V. Ramadas Murthy. 1973, 112p

Keywords: *Food, *Nutrition, *Health, Developing countries, Diets, Developing country application.

This booklet is a collection of radio talks in nutrition given to women, and rural community and industrial workers in Hyderabad, India. Topics involved are: rice and its nutritive value, jowar, ragi, bajra, the nutritive value of pulses, groundnuts, vegetables and their importance, leafy vegetables, milk, the effect of cooking on nutritive value, beverages, balanced diet, diets for pregnant women, nutrition of the nursing woman, breast milk, infant feeding, feeding and preschool child, applied nutrition program, rural nutrition project, effect of social and cultural beliefs on nutrition, status, nutrition and working efficiency, nutrition and infectious diseases, diets for industrial workers, diet and dental decay, obesity, kwashiorkor--the nutritional disorder among children, anemia, vitamin A deficiency, nutrition and family planning, vegetarian and non-vegetarian food, balanced diets, and the nutritive value of some common foodstuff.

PB82-165085 PC A03/MF A01
Ministry of Education and Culture, New Delhi (India).
National Adult Education Programme: The First Year
Oct 79, 43p

Keywords: Adults, *Education, *India, Developing countries, Literacy, Developing country application.

The report contains a one year appraisal of the National Adult Education Program (NAEP) formally launched on October 2, 1978 in India. The most significant aspects of NAEP are the flexibility of approach built into it and the conceptual position which visualizes it as indispensible to the country's development. It points out that from the point of view of social and economic planning the main justification for NAEP is that it can involve in the process of development the vast masses of illiterate and poor people who have remained deprived. Chapters of the report are devoted to implementation agencies, resource development, program management, financial arrangements, monitoring and evaluation, and future projects.

PB82-165598 PC A09/MF A01
International Potato Center, Lima (Peru).
Control of Important Fungal Diseases of Potatoes: Report of the Planning Conference, Lima, Peru, 1978
Jun 78, 187p AID-PN-AAH-722
Grant AID-DSAN-G-0079

Keywords: *Plant diseases, *Fungi, *Potatoes, Vegetables, Parasites, Foreign technology, Developing country application, Pathogens, Disease control, Verticillium.

Since potatoes constitute the staple food of much of the world's population, many studies have been conducted on methods of controlling potato diseases. This report of the Fifteenth Planning Conference sponsored by the International Potato Center presents an overview of the latest research on fungal potato pathogens. Disease-specific recommendations of this conference include: using three potato types with high, medium, and low disease resistance at all late-blight testing sites to provide standards with which to compare new potato clones; conducting studies on the physiology of late blight parasites to increase the ease and rapidity of identifying stable resistance in potatoes; determining if usable levels of resistance to early blight exist in potato germ plasm; and conducting a survey to determine the geographic distribution and importance of Verticillium (a soil-borne fungal pathogen). General recommendations include: preventing the spread of viruses, bacteria, and fungal pathogens to various regions of the world; and adopting tests for detecting the presence of pathogens other than fungi. A total of 265 references (1879-1978) in English, French, Dutch, and German conclude several of the papers.

PB82-165911 PC A05/MF A01
Agency for International Development, Washington, DC.
Proceedings of the U.S. Strategy Conference on Tropical Deforestation Held at Washington, DC. on June 12-14, 1978
1978, 85p Rept no. AID-PN-AAG-132

Keywords: *Forestry, *Tropical regions, Meetings, Forest trees, Demand(Economics), Wood, Population growth, Monitoring, Forest land, Land use, Energy, Government policies, Protection, Semiarid land, Ecology, Developing country application, Deforestation, Clear cutting, Revegetation.

Deforestation threatens to destroy the irreplaceable forest resources in tropical lands by the year 2000, with devastating socio-economic and environmental results. This report offers options to avoid those results. Conference topics included: (1) the nature of the problem; (2) international institutions' responses to date; (3) the state-of-the-art in biological research, commercial forestry and agroforestry, energy alternatives, and revegetation; (4) opportunities for industrial, environmental, and scientific actions; and (5) deforestation in humid and semiarid regions.

PB82-166968 PC A09/MF A01
Tanzania Industrial Studies and Consulting Organisation, Dar es Salaam.
Directory of Industrial Enterprises and Products in Tanzania
E. L. Kamuzora. 1981, 185p*

Keywords: Directories, Businesses, *Tanzania, Services, Commodities, *Industrial development, *Small businesses, Consumer products, Developing country application.

The Directory contains general information about Tanzania, an alphabetical index of products, an alphabetical index of services, an alphabetical list of enterprises in Tanzania, the list of products in Tanzania, the list of services in Tanzania, and the enterprises in Tanzania by region.

PB82-167016 PC A03/MF A01
Ministry of Agriculture, New Delhi (India).
Improved Farming Techniques of Jute
P. Sanyal. 1977, 36p

Keywords: Cultivation, Fiber crops, *India, Seeds, Planting, Soil properties, *Soils, *Fertilizers, *Pest control, Insecticides, *Weed control, Developing country application, *Jute, Manure.

The booklet describes briefly the soil conditions and the improved farming techniques used for growing jute in various states in India, including tillage, weeds and sowing and manures. Some general hints on the climatic requirements, jute belts of India, irrigation to jute crop, extraction of fiber, and pests and diseases are given.

PB82-167651 PC A04/MF A01
National Inst. of Health and Family Welfare, New Delhi (India).
Course on Research in Family Planning Communication. Course Report - Volume I
Technical rept. no. 2
R. K. Sanyal, and V. R. Naik. 6 Jun 75, 74p

Keywords: *Birth control, Developing countries, Contraceptives, Population growth, *Southeast Asian, Family planning, Developing country application, *Health education.

Thirty-two senior communication workers from eleven South-East Asian countries met on May 6, 1975 in a communication research training program at the National Institute of Family Planning, New Delhi, to share their experiences and learn together as to how best investigate the problems of family planning communication. They deliberated on methods and tools of research for reliable information and approaches for their common programs in their respective countries. The workshop continued for one month. This volume No. 1 of the course report covers various aspects concerning the planning and organization of the course, including course objectives and contents, program phasing, and evaluation. Another volume (No. 2) of the course report deals with the course material provided to the participants.

PB82-167669 PC A04/MF A01
Indian Council of Medical Research, New Delhi.
Studies on Pre-School Children
Technical rept.
C. Gopalan. 1974, 67p Rept no. ICMR/TR/SER-26

Keywords: *Children, Nutritional deficiency diseases, Food consumption, *India, Surveys, Rural areas, *Nutrition, Urban areas, Diets, Public health, Sampling, Methodology, Procedures, Anemias, Foreign technology, Developing country application.

The report reflects the comprehensive country-wide survey carried out on 18,356 pre-school children of six different regions of India. It reveals the widespread prevalence of malnutrition among the pre-school population both in rural and urban communities of India. The major nutritional problems encountered are protein-calorie malnutrition, hypovitaminosis A, anemia and deficiency of the B-complex vitamins. Sampling procedures and methodologies are outlined.

PB82-167677 PC A03/MF A01
Indian Council of Medical Research, New Delhi.
Manual of Standards of Quality for Drink Water Supplies (Second Edition)
1975, 28 Rept no. SR/SER-44

Keywords: Standards, Potable water, *Water quality, *India, Manuals, Sampling, Bacteria, Viruses, Toxicity, Hazardous materials, Radioactive wastes, Developing country application.

The Indian Council of Medical Research had published a 'Manual of Standards of Quality for Drinking Water Supplies' in 1962. This Manual contains revised chemical and bacteriological standards of quality for drinking water, and may be used to serve the purpose of standardization of quality for safe water supply in order to maintain public health and reduce morbidity from various water-borne diseases.

PB82-167693 PC A05/MF A01
National Inst. of Virology, Poona (India).
Japanese Encephalitis in India: Information Document (Revised 1980)
Jun 80, 83p

Keywords: *India, Encephalitis, Etiology, Epidemiology, Diagnosis, Therapy, Control, *Diseases, Public health, Clinical medicine, CNS disorders, Nervous system disorders, Viral diseases, Foreign technology, Japanese encephalitis.

This booklet is an information document which summarizes the present knowledge on various aspects of Japanese encephalitis including its causation, transmission, diagnosis, treatment and control measures. It depicts the work of the National Institute of Virology in an abridged form, useful for public health workers, clinicians working in hospitals and in the field and even the intelligent 'lay' public.

PB82-167719 PC A02/MF A01
Indian Council of Medical Research, New Delhi.
Acute Encephalopathy Syndrome in Children
Technical rept. series no. 3
Baldev Singh. 1970, 24

Keywords: *India, *Children, Encephalitis, Epidemiology, Public health, *Diseases, Diagnosis, Foreign technology, Developing country application, Medical research.

Repeated outbreaks of an encephalitis-like syndrome in children were reported in the past from Nagpur in Maharashtra and from several other parts of India. The disease was characterized by high fever of sudden onset followed by convulsions and sensory disturbances of varying degrees leading to a high case fatality. During 1969 the Council launched a comprehensive investigation with a team of investigators, representing different disciplines, who were assembled at Nagpur during the period of the epidemic so that the specialists could have constant consultation and interchange of information in the course of their day-to-day work. It was concluded that the clinical studies, EEG, recording, laboratory findings, serology, microbial and virus culture of blood and cerebro-spinal fluid and autopsy examination left no doubt regarding the fact that the Nagpur encephalitis syndrome was an encephalopathy. The epidemiological study revealed that this encephalopathy was the peak of an iceberg of pyrexial illnesses possibly due to some infective agent, viral or bacterial, and aggravated by the increase in ambient temperature. However, the usual organisms, microbial and viral, could not be demonstrated in spite of the meticulous studies done in the laboratory and the autopsy material.

PB82-167735 PC A03/MF A01
Indian Council of Medical Research, New Delhi.
Research in Malaria (An Outline)
C. Gopalan. 1977, 41

Keywords: *Malaria, Infectious diseases, *India, Parasitic diseases, Tropical diseases, *Diseases, Forecasting, Public health, Ecology, Drug therapy, Serology, Parasites, Immunology, Foreign technology, Developing country application, Medical research, Disease control, Pest control, Chemotherapy.

The Indian Council of Medical Research convened a meeting of a group of experts on Malaria in 1977 in order to review the current status of research in this field, and to indicate future lines of research. This group prepared a detailed report which would serve as a blue-print for future research-cum-action programes in the field of malaria. The broad outlines of the recommendations of the group with regard to future areas of research have been presented in the report. They are (1) Research on operational aspects of malaria control; (2) Ecology and control of vectors of malaria; (3) Chemotherapy of malaria; (4) Drug resistance in the malaria parasite; (5) Serology of malaria; (6) Cultivation of malaria parasites; and (7) Immunological aspects of malaria.

PB82-167990 PC A04/MF A01
National Inst. of Nutrition, Hyderabad (India).
Nutrition for Mother and Child
P. S. Venkatachalam, and L. M. Rebello. 1978, 68p
Rept no. SR/SER-41

Keywords: Nutritional requirements, *Children, Diets, *Nutrition, *India, Pregnancy, Infants, Females, *Women, Mothers, Developing country application.

The booklet sets out the nutritional needs of the mother during pregnancy and lactation, and of the infant and the pre-school child. It contains information regarding the diet for each of these groups and also practical ways of improving the present inadequate diets of the expectant and nursing woman, infants, and children at different economic levels. The low-cost nutritious preparations for children, described in the booklet, have been demonstrated to a group of rural mothers and later tested of their children for acceptability and tolerance. This booklet will serve a wider purpose than the training of the workers of the Health Centers, and will prove useful to the average Indian housewife in ensuring better health for herself and her child. An Appendix covers the choice and method of preparation of vegetables.

PB82-138170 PC A02/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Drying Vegetables for Storage
Aug 76, 15p

Keywords: *Fruits, *Vegetables, Drying, Food preparation, *Food storage, *India, Developing country application.

The booklet briefly describes drying methods of vegetables and the preparing work needed, including washing, slicing, dipping, steaming or blanching and sulfuring. A vegetable drying chart and a chart of sulfuring of fruits are given in the booklet.

PB82-168188 PC A03/MF A01
Ministry of Agriculture, New Delhi (India).
Sorghum Diseases in India and Their Control
N. V. Sundaram, and S. P. Raychadhuri. 1973, 50p

Keywords: *Plant diseases, Grain sorghum plants, *Pest control, Fungus diseases, *Sorghum, *India, Bacterial diseases, Viral diseases, Parasites, Insecticides, Fungicides, Bactericides, Developing country application.

The important diseases of sorghum and their control are described. Symptoms, causal organisms, and control measures are listed under the title of each disease. Diseases covered are: fungus diseases; bacterial diseases; virus diseases; parasites; and deficiency diseases.

PB82-168634 PC A04/MF A01
Hindustan Everest Tools Ltd. (India).
Appropriate Technology Project at Nagina
1980, 61p

Keywords: *Technology transfer, Industrial plants, Skilled workers, Craftsmen, *Appropriate technology, *India, Motivation, Attitudes, Developing country application.

The report is a discussion and analysis of the hypothesis that a medium-sized industrial organization in the private sector, with the right blend of management and technical skills, can be motivated to scale down its technology and pass it on to relevant 'traditionally skilled craftsmen' who will benefit from such a transfer of technology. Also discussed is how such an organization can participate in the technococio-economic development of the traditionally skilled craftsman. Conclusions of the report indicate that modern technologies can be scaled down and blended with traditional skills to provide a viable livelihood for local artisans.

PB82-168998 PC A03/MF A01
Himachal Pradesh Univ., Solan (India). Agricultural Complex.
A Guide to Mushroom Cultivation
E. F. K. Mantel, R. K. Agarwala, and P. K. Seth.
1972, 30p
Sponsored in part by Ministry of Agriculture, New Delhi (India).

Keywords: Cultivation, Mushrooms, Buildings, Soil properties, Humus, Mulches, Plant diseases, *Vegetables, Fermentation, *India, Developing country application.

The booklet deals with the indoor cultivation of the mushroom, Agaricus bisporus, which can be grown best under temperature conditions. It is concerned mainly with the requirements of small to medium sized mushroom houses built on cottage scale. All aspects of mushroom growing are covered including trays and housing, compost, fermentation, spawning, casing soil, watering, storage, diseases and pests, and economics.

PB82-169582 PC A04/MF A01
National Inst. of Health and Family Welfare, New Delhi (India).
Guide to Staffing Pattern for Hospitals
Technical rept. no. 5
T. R. Anand, P. N. Ghei, and A. Timmappaya. 1977, 54p

Keywords: Hospitals, Manpower requirements, Medical personnel, Personnel management, *India, *Health care delivery, Health facilities, Developing country application, *Health manpower.

Hospital planners and administrators have been fulfilling the need for setting up norms for the staffing patterns for hospitals of various sizes. In this report, staffing patterns for 30 bed rural hospitals, general hospitals of varying sizes 50 to 500 beds, and teaching hospitals of 750 beds are presented. A small note on the residency scheme which was introduced in hospitals under the Ministry of Health is also given to provide guidance to other teaching institutions on this subject. Standard requirements for a 30 bed ward, an IV fluid manufacturing unit, and line and laundry departments are also included in the report.

PB82-169947 PC A03/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Grow Peaches in the Plains
J. P. Singh, and S. D. Chitkara. Jul 76, 26p Rept no. 16
Prepared in cooperation with Indian Council of Agricultural Research, New Delhi and Haryana Agricultural Univ., Hissar (India).

Keywords: Cultivation, Peach trees, *India, Planting, Soil properties, *Fruits, Protection, Plant propagation, Harvesting, Pest control, Plant diseases, Developing country application.

The booklet presents a few guidelines for the benefit of those who intend to undertake the venture of peach cultivation in sub-mountainous and sub-tropical regions. The varieties of peaches, soil, propagation, budding, spacing of trees, planting, harvesting, and controlling of pests and diseases are briefly discussed in the booklet.

PB82-170820 PC A04/MF A01
Indian Council of Medical Research, New Delhi.
Health Hazards of Mycotoxins in India
Ramesh V. Bhat, V. Nagarajan, and P. G. Tulpule.
1978, 69p

Keywords: *India, Toxins, *Fungi, Occurrence, Developing countries, Contaminants, *Food contamination, Feeding stuffs, Animals, Humans, Prevention, Control, Tolerance(Physiology), Surveillance, Foreign technology, Mycotoxins, Developing country application.

The danger from mycotoxins is very high in developing countries of the world because of climatic conditions which are favorable for mould growth, and inadequate pre- and post-harvest practices which promote elaboration of toxins in staple food-grains. This report discusses the following major aspects of the problems concerned with mycotoxin contamination in foods and feeds: (1) General conditions leading to fungal contamination; (2) Occurrence and prevalence of fungal contamination; (3) Mycotoxicoses in animals; (4) Mycotoxicoses in humans; (5) Approaches towards prevention and control; (6) Centers with research capability for study of mycotoxins; (7) National regulations for tolerance limits; and (8) The need for a national program of surveillance for mycotoxins in foods and feeds.

PB82-171281 PC A05/MF A01
National Inst. of Family Planning, New Delhi (India).
Proceedings of National Conference on Population - December 6-8, 1974
A. K. Ishaque, and Karan Singh. Dec 74, 63p

Keywords: Meetings, Population growth, *India, *Birth control, *Population control, Developing countries, Family planning, Developing country application, Natality, Birth rate.

The National Conference on Population was held in New Delhi, India, between December 6-8, 1974. This proceeding contains the findings of the Conference together with a selection of some papers presented in Plenary Sessions. The target for family planning raised in the conference was to bring down the population growth rate in India by one point per thousand every year for the next ten years, lowering the growth rate to 1.7 percent by the end of the Fifth plan and 1.4 percent by the end of the Sixth Plan. It was found in the Conference that the prospects of the reduction of the birth rate were closely linked with the prospects of economic development and were also lined with vigor and viability of the family planning program. Without the attainment of a level of economic and social development satisfying at least the minimum needs of the people, it was unrealistic to expect a rapid reduction in the birth rate. The participants of the Conference also discussed various contraceptive technologies and put forward detailed recommendations in this field. Also discussed at the Conference were population policy, and organization and management of the program.

PB82-171679 PC E99
Department of Agriculture, Washington, DC.
Soils and Men, Yearbook of Agriculture 1938
1938, 1254p-in 5v
See PB82-171687, PB82-171695, PB82-171703, PB82-171711, PB82-171729.

Keywords: *Soils, *Agriculture, *United States.

No abstract available.

PB82-171687 PC A15/MF A01
Department of Agriculture, Washington, DC.
Soils and Men, Yearbook of Agriculture 1938. Part 1: The Nation and the Soil
Bushrod Allin. 1938, 334p
Also available in set of 5 reports PC E99, PB82-171679.

Keywords: *Soils, *Agriculture, Soil fertility, Soil erosion, Arid land, Policies, Agricultural economics, *United States, Land reclamation, Public land, Developing country application.

The objective in this section of the Yearbook is fourfold: To describe as clearly as possible what the public purposes in soil use are or should be; to indicate the present extent and nature of soil misuse; to discuss possible social and economic causes of misuse of the soil; and to suggest remedial action.

PB82-171695 PC A19/MF A01
Department of Agriculture, Washington, DC.
Soils and Men, Yearbook of Agriculture 1938. Part 2: The Farmer and the Soil
A. L. Patrick. 1938, 433p
Also available in set of 5 reports PC E99, PB82-171679.

Keywords: *Agriculture, *Soils, Cultivation, Soil fertility, Humus, Nitrogen, Phosphorus, *United States, Potassium, Fertilizing, Arid land, Acidity, Forest land, Developing country application, Crop rotation.

This part of the yearbook deals with soil management and practices, with a view to increasing the individual's understanding of possible ways to solve his own problems. Beginning with tillage and tillage implements, the author discusses deficiencies of the soil in organic matter, nitrogen, phosphorus, and potassium, and tells in general how these deficiencies may be corrected. Next, the author considers the purpose and use of rotations, cover crops, farm manures, and other organic amendments in the farming system.

PB82-171703 PC A06/MF A01
Department of Agriculture, Washington, DC.
Soil and Men, Yearbook of Agriculture 1938. Part 3: Soil and Plant Relationship
M. A. McCall. 1936, 112p
Also available in set of 5 reports PC E99, PB82-171679.

Keywords: *Soils, Farm crops, Requirements, Plant nutrition, Vegetables, Fruit crops, *Agriculture, *United States, Selenium, Developing country application.

This part of the Yearbook discusses some of the relationships between the plant and the soil in many aspects--the soil requirements of the more important crops; the effects of the major chemical elements in the soil on plant nutrition, and on the nutrition of the animals that use the plants for food.

PB82-171711 PC A08/MF A01
Department of Agriculture, Washington, DC.
Soils and Men, Yearbook of Agriculture 1938. Part 4: Fundamentals of Soil Science
Charles Kellogg. 1938, 157p
Also available in set of 5 reports PC E99, PB82-171679.

Keywords: Soil science, Soil physics, Soil chemistry, Soil water, Soil classification, Soil microbiology, *Agri-

culture, *Soils, *United States, Humus, Developing country application.

Physics, chemistry, and biology all contribute to our knowledge of the soil. In this part of the Yearbook, an effort is made to summarize the main outlines of this science as it is understood today. The first article gives a soil scientist's philosophy of the part played by soil in the affairs of mankind. Following this are articles on the physical nature, the water relations, and the chemistry of the soil. The role of organic matter and the activities of living organisms in the soil are then discussed. Following this is an article on the rather complex business of classifying soils according to the principles worked out in the 1930's.

PB82-171729 PC A10/MF A01
Department of Agriculture, Washington, DC.
Soils and Men, Yearbook of Agricultura 1938. Part 5: Soils of the United States
Charles Kellogg. 1938, 218p
Also available in set of 5 reports PC E99, PB82-171679.

Keywords: *Agriculture, *Soils, *United States, Soil profiles, Geography, Vegetation, Climate, Developing country application.

The report attempts to bring together and summarize, on a comparatively small scale, the data accumulated during the past half century on the enormous variety of soils in the United States. It describes the U.S. soil associations and the soils that compose them. The associations are arranged under the great soil groups. First there is a description of the region dominated by the great soil group, and then more detailed descriptions of each soil association within the region. These descriptions include the geographic setting, the climate, the native vegetation, the parent material from which the soils have developed, the characteristics of the soils themselves, and their general uses.

PB82-171836 PC A06/MF A01
Ministry of Health and Family Planning, New Delhi (India).
Operations Research for Improved Delivery of Health Services
A. Timmappaya. Aug 76, 116p

Keywords: *India, Operations research, Management, Health services administration, *Health care delivery, Health services.

In order to improve the Indian health services administration, A Task Force on Operations Research for Improved Delivery of Health Services was constituted by the Ministry of Health and Family Planning of India in July, 1974. The report is the outcome of the Task Force. It presents a critical appraisal of the health care delivery system and the studies thereon, the scope and content of operations research in health services, problem areas for operations research studies and their prioritization, and the administrative machinery for management research.

PB82-172651 PC A02/MF A01
National Inst. of Family Planning, New Delhi (India).
Studies in Family Planning: South East Asian Countries
R. K. Sanyal, and Mukta Gour. Nov 75, 22p Rept no. BIB/SER-2

Keywords: Bibliographies, Family planning, *Southeast Asia, *Birth control, Indonesia, Iran, Malaysia, Thailand, Developing country application.

This is an annotated bibliography of the state of knowledge, progress, and studies in family planning in South East Asia with particular reference to Indonesia, Iran, Malaysia, and Thailand.

PB82-172669 PC A03/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Pig Farming - Feeding and Management Practices
S. Krishnamurthy. Feb 81, 30p

Keywords: Swine, Feeding stuffs, Proteins, Fertility, Reproduction(Biology), *Animal husbandry, *India, Developing country application.

Much of the success of pig production depends on the feeding program. The booklet gives tips for computation of rations and the recommended levels of protein in swine ration. It describes the management of breeding herds, particularly the causes of infertility and the measures for improving fertility.

PB82-172677 PC A02/MF A01
National Inst. of Family Planning, New Delhi (India).
Factors Associated with Knowledge and Practice of Family Planning
V. Dutt Mullick. May 74, 22p Rept no. NIFP/TP-19

Keywords: Family planning, *Birth control, Demography, Socioeconomic factors, *Employment, *Education, Age, *India, Developing country application.

Most of the studies on knowledge and practice of family planning have been of descriptive nature, with no attempt to relate them to other factors. In this study, factors related to knowledge and practice of family planning have been sought, to be identified with focus being placed on demographic factors such as age, living children, male living children and desire for more children, and socio-economic characteristics such as the occupation and education of the wife and husband and their religion.

PB82-172685 PC A04/MF A01
National Inst. of Family Planning, New Delhi (India).
Status of Women and Fertility in India
D. C. Dubey, and Amita Bandhan. 1970, 55p Rept no. MONO/SER-18

Keywords: Fertility, *India, Reproduction(Biology), Status, Families, *Women, Mothers, Developing country application.

The monograph describes the relationship between women's role as a mother and how it influences her status. In part 1 the authors tried to associate women's status with her reproductive role in the family and the larger society. In part 2 the authors have discussed some major social changes in terms of urbanization, industrialization, education, the political system, and employment of women brought about by progressive state policies, and discusses what their implications on the status and fertility of women are.

PB82-172693 PC A04/MF A01
National Inst. of Family Planning, New Delhi (India).
Use of Intra-Uterine Contraceptive Device (IUD): A Review
V. Dutt Mullick, and R. Chhabra. 1977, 70p Rept no. MONO/SER-20

Keywords: Contraceptives, *Birth control, Fertility, *India, Intrauterine devices, Developing country application.

This paper reviews the available knowledge on intrauterine contraceptive devices (IUD), including the mechanism of action, selection of potential acceptors, technique of insertion, and post-insertion fertility and contraceptive behavior. The main recommendations made by different workers and experts for the improvement of the IUD program in India are also compiled.

PB82-172701 PC A02/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Growing Pointed Gourd
S. S. Chatterjee. Jan 76, 14p Rept no. 12

Keywords: *Vegetables, Plant growth, Climate, Soil properties, Planting, Fertilizers, *Plant diseases, *India, Developing country application, Trichosanthes dioca, Pointed gourd.

Pointed gourd is widely cultivated in some states of India. The total area in the country under this crop has been estimated at about 10,000 hectares. The booklet briefly describes its food value, suitable climate conditions, the soil and its preparation, varieties, planting, manures and fertilizers needed, cultivation and irrigation, yield, and diseases and pests and their control.

PB82-172867 PC A04/MF A01
Ahmedabad Textile Industry's Research Association (India).
Low Viscosity Tamarind Kernel Powder: A Low Cost Sizing Material
H. C. Srivastave, J. R. Madi, H. P. Patel, and T. D. Thakarar. Apr 76, 58p
Proceedings of half-day seminar held at ATIRA on 21 Apr 76.

Keywords: Sizing(Shaping), *Textile industry, Meatings, *India, Low viscosity tamarind kernel powder, Developing country application.

In the context of population explosion and recurrent shortage of food in India, alternatives to maize and tapioca starches for textile sizing were sought. As a result of this search and extensive basic and applied work, Low Viscosity Tamarind Kernel Powder (LTKP) was born. This report discusses the nature and properties of LTKP, evaluates it as a sizing material, and presents some practical experiences in the use of LTKP.

PB82-174475 PC A04/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Getting High Yields of the Potato: Potato Production and the Control of Its Diseases and Pests
1977, 58p

Keywords: Plant growth, *Potatoes, Cultivation, Planting, Seeds, Acceptability, Fertilizers, *Plant diseases, *Pest control, Pesticides, *India, Developing country application.

The document includes four booklets concerned with potato production. Topics covered include crop rotation, planting, watering, intercultivation, fertilizer, late blight, early blight, black scurf, charcoal rot, powdery scab, wart, brown rot, viral disease, aphids, cut worms, epilachna beetles, caterpillars, tuber moth, whit grubs, mites, and nematodes.

PB82-174483 PC A04/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Improved Implements for Rice Growing in Rainfed Areas and Manual Weeding Tools
P. J. Zachariah, P. N. Pangotra, and V. A. Patil. Mar 81, 51p Rept no. FARM BULL-2/1978

Keywords: *Rice, *Agricultural machinery, Cultivation, Plows, Disks(Agricultural), Fertilizing, Harvesting, *Weed control, *Hand tools, *India, Developing country application.

Drill sowing ensures good germination, optimum plant population and full utilization of fertilizer which are essential for increasing the yield of rice. Implements required for seedbag, preparation, drilling the seed and fertilizer accurately and for making weeding operations easy are described in this booklet. In the booklet different methods of weed control are also described with special reference to the mechanical method of weed control with weeding tools.

PB82-174491 PC A04/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Growing High Yielding Varieties of Paddy and the Pests of Rice and their Control
J. N. Hota, and J. P. Kulshrestha. Jul 71, 51p Rept no. BULL-1/71

Keywords: *Rice, Planting, Yield, Fertilizers, *Weed control, *Plant diseases, Rats, *Pest control, *India, Developing country application.

The report includes two parts. In the first part, the characteristics of some important high-yielding varieties of paddy rice is given and the points for attention necessary in seed treating and care, direct sowing, field preparation and manuring, transplanting, weed control, insects, diseases, rat control, water managing, and harvesting are listed. In the second part, it is pointed out that in India, seventy species of insect pests on rice have been recorded attacking at various stages of its growth. This part briefly describes the characteristics of different pest species, the signs of attack, and the control methods.

PB82-174533 PC A04/MF A01
National Dairy Research Inst., Karnal (India).
Feeding Dairy Cattle and Buffaloes Economically
V. D. Mudgal, S. P. Arora, and C. K. Kurar. 1979, 75p
Four papers are included in the report.

Keywords: Feeding stuffs, Dairy cattle, Animal nutrition, Proteins, Grasses, Vitamins, Corn, Profits, *Animal husbandry, *Dairies, *India, Developing country application, Buffaloes, Silage.

The report includes four papers titled, 'Feeding Dairy Cattle Economically', 'Feeding of Buffaloes', 'Green Feeding to Cross-Bred Cows and Buffaloes for Milk Production' and 'Silage Making'. Subjects covered are protein, water and minerals, roughage, metabolic disorders, non-nutritive additives, vitamins, and good rations for dairy cattle.

PB82-176009 PC A03/MF A01
National Dairy Research Inst., Karnal (India).
Feeding of Goats
C. K. Kurar, and V. D. Mudgal. 1980, 32p

Keywords: Goats, Feeding stuffs, Domestic animals, Livestock, *Animal husbandry, *India, Standards, Protein, *Milk, Reproduction, Developing country application.

The proper feeding of goats is as important as the feeding of any other farm animal. Lack of attention in feeding may lead to its poor performance. The report discusses feeding habits, feeding problems, and feeding standards, including energy and protein requirements for maintenance, milk production, and reproduction, to provide a practical feeding program for goats.

PB82-176017 PC A02/MF A01
National Dairy Research Inst., Karnal (India).
How to Adapt Buffalo Milk for Cheese Making
1979, 15p

Keywords: Cheeses, *Food processing, *Milk, *Dairies, *India, Temperature, Manufacturing, Curing, Food storage, Pasteurizing, Cutting, India, Developing country application, Buffaloes.

The report briefly describes experiments with buffalo milk for cheese making and proposes a modified method. The steps for manufacture of cheddar cheese, brick-type cheese, Karnal cheese, and high acid cottage cheese from buffalo milk are listed.

PB82-176934 PC A03/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Exploration and Identification of Alternative Raw Materials for Paper and Newsprint Manufacture: Properties of ETA Reed Pulps, Laboratory Study
Research progress rept. no. 1
S. V. Singh, T. C. Mantri, U. K. Deb, D. Ghosh, and A. G. Kulkarni. Dec 77, 49p

Keywords: *Pulp, Chemical properties, Bleaching, Tear strength, *Reed, *Paper industry, *India, *Paper, Eta reed pulps, Developing country application.

The variations in chemical composition, and variation of pulp properties of eta reeds from various Ochlandra species and variations are investigated. Both unbleached and bleached eta reed pulps have an unusually high tear factor, much higher than bamboo pulps, even higher than kraft softwood pulps. Breaking length, burst factor, and double folds are higher than bamboo pulps and only slightly lower than those of softwood pulps.

PB82-177569 PC A03/MF A01
Economic Research Service, Washington, DC. International Economics Div.
Wheat Import Demand Among Middle-Income Developing Countries: A Cross-Sectional Analysis
Cathy L. Jabara. Feb 82, 20p* Rept no. AGES-820212

Keywords. *Wheat, Demand(Economics), *International trade, Developing countries, Imports, Prices, Income, Populations, Economic models, Production, Earnings, Constraints.

Middle-income developing countries have an important role in international grain trade. This paper examines wheat import demand relationships for 20 middle-income developing countries. Parameters for hypothesized relationships are estimated through econometric analysis. Key variables which appear to affect wheat import are population, foreign exchange earnings, wheat production and stocks, and the level of consumer prices.

PB82-177718 PC A05/MF A01
Intermediate Technology Development Group, London (England).
Un Manual sobre Mantenimiento de Edificios. Tomo 2. (A Manual on Building Maintenance. Volume 2: Methods).
Derek Miles. 1976, 94p
Text in Spanish.

Keywords: *Buildings, *Maintenance, Developing countries, Cleaning, Services, Walls, Foundations, Plastering, Painting, Roofs, Roofing, Guidelines, *Great Britain.

The volume deals with the basic technology of building maintenance. The function of maintenance includes three parts: cleaning and servicing, rectification and repair, and replacement. The book will assist in the examination of maintenance problems, suggesting some of the more common causes of failure and methods for dealing with these problems. The contents include: foundation, walls, plastering and rendering, paints and thin coatings, and roofing.

PB82-178021 PC A03/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Exploration and Identification of Alternative Raw Materials for Paper and Newsprint Manufacture: Examination of Salai Groundwood and Cold Soda Pulps and Bamboo Sulphate Pulp from National Newsprint Mill, Nepanagar
Research progress rept. no. 5
T. C. Mantri, Y. K. Sharma, V. Ragunath, S. Bharati, and Y. V. Sood. Dec 78, 36p

Keywords: *Bamboo, Newsprint, Optical properties, Mechanical properties, *Pulp, *Paper industry, *India, Tensile strength, Tear strength, Cold soda pulps, Salai groundwood, Developing country application.

Mill samples of salai (Boswellia serrata) cold soda, salai groundwood, and bamboo chemical pulps were collected from National Newsprint Mills Limited, Nepanagar, to evaluate their strength and optical properties. Examination indicates that pulps with higher strength properties and improved brightness values can be produced. The main area requiring attention as far as strength properties are concerned is in the salai cold soda plant. Beating in laboratory equipment (PFI mill) to a CSF of 180 gave more than a five fold increase in tensile strength and a 50% improvement in tearing strength. This improvement in bonding characteristics is important to the strength of the newsprint finish.

PB82-178039 PC A04/MF A01
National Dairy Research Inst., Karnal (India).
Forage Crops: Package of Practices
D. Sundaresan. 1979, 57p

Keywords: Cultivation, Forage crops, Forage grasses, *Leguminous plants, Planting, Forage legumes, Irrigation, Fertilizing, Weed control, Harvesting, India, Developing country application.

This report presents information available on the cultivation of forage crops. The soil and its preparation, varieties, sowing time, seed rate and method of sowing, fertilization, irrigation, weed control, and harvesting of each crop are given.

PB82-178047 PC A03/MF A01
National Dairy Research Inst., Karnal (India).
Energy and Protein Requirements of Various Ruminant Species and Development of Feeding Standards
Summary research rept.
V. D. Mudgal. 1980, 38p

Keywords: Ruminants, Livestock, Animal nutrition, Standards, Growth, Cattle, *Animal husbandry, *Nutrition, Stand, Goats, Proteins, Feeding stuffs, Maintenance, Tables(Data), *India, Developing country application.

On the basis of experiments, the Indian Standards Institution has developed feeding standards for various categories of livestock, which often differ from American standards. The report covers nutrient requirements for growth, maintenance, and production in Zebu cattle, crosses between Zebu and Bos Indicus, buffalo, and goats.

PB82-178054 PC A03/MF A01
National Dairy Research Inst., Karnal (India).
Murrah Buffaloes at National Dairy Research Institute, Karnal
S. B. Basu, D. S. Bhatnagar, D. Sundaresan, M. Gumani, and R. Nagarcenkar. 1975, 35p

Keywords: Dairy cattle, *Animal husbandry, *Dairies, *India, Reproduction(Biology), Growth, Maturation, Breeding, Animal nutrition, *Milk, Production, Developing country application, Buffaloes.

The gestation, birth, growth, maturity, lactation, milking, and nutrient requirements of Indian Murrah buffaloes, and how to breed better buffaloes are reviewed in this report.

PB82-178062 PC A03/MF A01
National Dairy Research Inst., Karnal (India).
Dairy Demonstration Units at National Dairy Research Institute, Karnal (Five Hectare Dairy Demonstration Unit. Two Hectare Mixed Farming Unit. One Hectare Buffalo Unit. One Acre Mini Dairy Unit)
S. C. Das, R. K. Patel, and Ram Singh. 1980, 44p

Keywords: *Dairies, Dairy cattle, *India, Performance evaluation, Forage crops, *Animal husbandry, *Milk, Land use, Production, Investments, Feeding stuffs, Dairy equipment, Expenses, Developing country application, Buffaloes.

The report describes four dairy demonstration units developed in the National Dairy Research Institute, Karnal, India. The first demonstration unit commenced in 1971 with 5 hectares of land supporting initially 20 high yielding cows, subsequently, raised to 30. The performance of this unit for an 8 year period is presented. The second demonstration unit was commenced in 1973 as a 2 hectare farm unit with one hectare supporting 6 animals and another hectare producing high yielding crops. In 1974, a demonstration unit with 6 buffaloes supported by 1 hectare of land was developed.

PB82-178732 PC A09/MF A01
National Inst. of Health and Family Welfare, New Delhi (India).
An Evaluation of Community Health Workers' Scheme: A Collaborative Study
Technical rept. no. 4
Sharad Kumar, J. P. Gupta, T. J. Ramaiah, and K. G. Rao. 1978, 181p

Keywords: *India, Objectives, Selection, Profiles, *Community development, Performance, Foreign technology, *Health manpower, Developing country application, Community health services, *Health education, Health services administration.

This report is the outcome of collective effort on the evaluation of the community health Workers' (CHW) Scheme undertaken at the instance of the Government of India. It delineates several dimensions of the Scheme. Including its understanding, perception of its objectives, and role of officials concerned in its implementation at different levels. A study has been made of the processes that exist in different States in the selection of CHW's; various kinds of inputs brought into the Scheme such as training, medicines and drugs, kits, honoraria, and appointment of additional Medical Officers at the Primary Health Centre; the profile of selected CHW's; and perception and attitudes towards the Scheme as well as towards the selected CHW's of the community leaders, community members, Primary Health Centre staff, and other non-health functionaries at the block and district levels. Based on the analysis of data collected and processes adopted, inter-state variations of the scheme are identified. Specific recommendations have been made for taking corrective measures with regard to the Scheme.

PB82-178740 PC A03/MF A01
Ministry of Agriculture, New Delhi (India).
Grapevine Diseases and Their Control
N. V. Sundaram, and Ravi Varma. Sep 71, 34p Rept no. BULL-2/71

Keywords: Grapevines, *Plant diseases, Fungus diseases, *Fruits, Fungicides, Virus diseases, Sanitation, Parasites, Identifying, Climate, *India, Developing country application.

The important diseases of grapevine, their symptoms and control measures based on experiments conducted in India and in other countries are described here. These diseases are: downy mildew, powdery mildew, anthracnose, black rot, rust, brown leaf spot, fruit-rot diseases, root diseases, virus diseases, Pierce's disease, and deficiency diseases.

PB82-178757 PC A03/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Nutrition
1981, 32p

Keywords: *Nutrition, Developing countries, Nutritional requirements, *Proteins, Carbohydrates, *India, Fats, Diets, Developing country application.

The booklet describes the functions and daily requirements of some important food constituents such as proteins, carbohydrates, fats, calcium, iron, iodine, vitamins, thiamine, riboflavin, roughage, water, diet, and how much to eat. The importance of these food constituents is shown through illustrations that depict what deficiencies of them do to people. This is a sketchy booklet meant to bring a basic understanding of nutrition to poorly educated people.

PB82-179466 PC A03/MF A01
Indian Council of Medical Research, New Delhi.
Research in Health Practices
K. N. Rao, D. Anand, B. G. Prasad, B. G. Tiwari, and T. R. Pareek. 1970, 38p Rept no. TR-SER-2

Keywords: Project management, Communities, Developing countries, *India, Developing country application, Health services, Health manpower, Social services, *Health, Community health services, Medical education, *Health education.

In order to stimulate inter-disciplinary action-oriented research in the field of medical education and health practices, the Indian Council of Medical Research constituted an Expert Committee on Research in Health Practices, and the present report embodies the working papers presented at the Committee meeting. The paper of 'Research in Health Practices' deals with the Community Research and Operations Research in the field of Health Practices; the paper, 'An Approach to the Study of Health Practice' emphasizes the importance of health practices for strenthening the community health program and the teaching of under-graduate medical students; the paper, 'Necessity for Research in Health Practices' points out the need of research both on the technical aspects as well as the administrative and operational aspects of health practices; the paper, 'The Concept of Health Practices as an Educational Programme' reviews the role of National Institute of Health Administration and Education. The final paper is 'Social Science Dimensions of Research in Health Practices'.

PB82-182106 PC A05/MF A01
National Research Council, Washington, DC.
Nutrient Rquirements of Goats: Angora, Dairy, and Meat Goats in Temperate and Tropical Countries
Rept. no. 15 (Final).
1981, 100p Rept no. ISBN-0-309-03185-0
Sponsored in part by Agency for International Development, Washington, DC., Science and Education Administration, Washington, DC., Food and Drug Administration, Rockville, MD. Bureau of Veterinary Medicine, and American Dairy Goat Association, Spindale, NC. Library of Congress catalog card no. 81-84592.

Keywords: Animal nutrition, Goats, Requirements, Temperate regions, Tropical regions, Proteins, Vitamins, Toxicity, Water supply, Grasses, Feeding stuffs, Animal diseases, Metabolism, Food composition, Tables(Data), Reproduction(Biology), Meat, Hair, Dairies, Rations, *Animal husbandry, Silage.

The report establishes nutrient requirements of goats from original studies directly concerned with the needs of goats. Past efforts relied heavily on extrapolation of values derived from cattle and sheep studies. The discussion of energy and protein requirements contains much new information from extensive research at the Raja Balwant Singh College at Bichpuri (Agra), India. The material on mineral, vitamin, and water requirements and on nutrition-related metabolic disorders relied mostly on reviewing past work. The discussion on herbage and browse utilization includes new work from Texas. Treatment of ration formulation and examples of typical rations and tables of nutrient requirements are described in the report. Because of the unique nature of goats, the nutrient requirement tables also include allowances for activities during grazing.

PB82-186634 PC A03/MF A01
Maharashtra Engineering Research Inst., Nasik (India).
Effect of Calcium Chloride on the Properties of Concrete and Mortar
Technical memo.
P. K. Nagarkar. Jun 77, 26p Rept no. TM/MT-137

Keywords: *Concrete, Mortars(Materials), Calcium chlorides, Cement additives, Admixtures, *Building materials, Materials specifications, Foreign technology.

Specifications for using calcium chloride in concrete and mortar provide that calcium chloride should be used in small amount expressed as percent weight of cement to get an early age strength development. This effect is more visible when it is used with a mixing and curing temperature below 70F. This study was taken up to find out experimentally the optimum percentage of calcium chloride which can give early strength development generally in hot weather and also to find out its effect on setting time, rate of strength development of concrete and mortar as well as its effect on corrosion of steel and shrinkage.

PB82-186842 PC A02/MF A01
Maharashtra Engineering Research Inst., Nasik (India).
Properties of Cellular Concrete
Technical memo.
P. K. Nagarkar. Jun 77, 13p Rept no. TM/MT-139

Keywords: Cellular concretes, Lightweight concretes, Fly ash, Cement additives, Water cement ratio, Compressive strength, Foreign technology, *Concrete, *Industrial wastes.

The purpose of the study is to evolve a method of manufacturing light weight cellular concrete produced by using cement as a binder and flyash as filler material. The concrete becomes cellular if aluminum powder and sodium hydroxide is added to it. The structure of the concrete becomes cellular due to introduction in it, of either gas or air. The aluminum powder on reaction with alkalies liberates hydrogen gas which is uniformly distributed in the matrix. To add to the alkali content, and for proper dispersion NaOH and different dispersing agents are used. The ingradients of the cellular concrete are cement, fly ash, aluminum powder, sodium hydroxide and water. For good dispersion of aluminum powder and cement some dispersing agents are also tried.

PB82-186859 PC A06/MF A01
Indian Society of Earthquake Technology, Roorkee.
A Manual of Earthquake Resistant Non-Engineered Construction
1981, 114p

Keywords: Earthquake resistant structures, *Buildings, Construction materials, Structural design, Guidelines, Foundations, Structural analysis, Foreign technology, *Earthquake engineering, Seismic design.

The non-engineered constructions in stone, brick, adobe, and composite systems with wood, concrete or steel pose a serious damage-risk problem in seismic belts of the earth. Most losses of life during earthquakes have occurred due to the collapse of this type of buildings. It is unfortunate that this risk is increasing, rather than decreasing, in most countries on account of rising population, poverty of the people, scarcity of wood, cement and steel, lack of understanding of earthquake resistance features, etc. The increasing magnitude of seismic risk to life could be imagined by the fact that number of dwelling units and other related small scale constructions may double itself in the next 25-30 years due to the explosion of population in India and other developing countries. There is thus a great urgency that the know-how of inexpensive earthquake resistance measures in such constructions should be propagated very quickly and by simple illustrations, so that these techniques could find application at least in the new constructions. This publication is aimed at fulfilling this urgent need of providing the relevant information for ready use to not only the architects and engineers but also the public and private builders who may not have the necessary technical background.

PB82-188525 PC A04/MF A01
National Dairy Research Inst., Karnal (India).
Karan Swiss Developed at National Dairy Research Institute
D. S. Bhatnagar, R. C. Sharma, and D. Sundaresan. 1979, 63p Rept no. PUB-155

Keywords: *India, Dairy cattle, Genetics, Breeding, *Animal husbandry, Growth, Animal nutrition, *Milk, *Dairies, Animal physiology, Animal diseases, Reproduction(Biology), Developing country application, Karan Swiss.

A strain of cattle with about half Indian indigenous Sahiwal and half American Swiss inheritance has been bred and named 'Karan Swiss.' The report describes the development, growth, and reproduction, milk production performance, nutrient requirements for maintenance and milk production, and physiological and health status of the Karan Swiss. It is a more efficient converter of feeds into milk as compared to Indian indigenous cows and buffaloes. Karan Swiss continued to be efficient even in lean fodder season.

PB82-188681 PC A11/MF A01
National Dairy Research Inst., Karnal (India).
Dairy Handbook (Production)
Nov 79, 243p

Keywords: *India, *Dairies, Handbooks, Breeding, *Milk, Feeding stuffs, Dairy cattle, Goats, *Animal husbandry, Animal diseases, Urea, Feeding(Supplying), Dairy equipment, Developing country application, Buffaloes.

The handbook provides information concerned with milk production, including breeding, calf rearing, feeding, health care, and equipment practices used in raising cattle, buffaloes, and goats. The handbook gives the workers and dairy farmers a basic understanding of appropriate technology available for and standard management practices in producing milk.

PB82-194804 PC A03/MF A01
Economic Research Service, Washington, DC. International Economics Div.
Impact of Land Degradation on Future World Food Production
Harold E. Dregne. Mar 82, 39p* Rept no. ERS-677

Keywords: *Land use, Erosion, *Agricultural economics, *Food, Developing countries, Population growth, Cultivation, Soils, Farming, Technology transfer, Land development, Africa, Asia, South America, Central America, Improvements, *Soil erosion, Marginal lands, Global.

Land degradation will likely curb agricultural production increases in the developing countries of Africa, Asia, and Central and South America. Growing populations and weak economies in many countries will seriously hamper efforts to bring new land under cultivation. Forty percent of the world's available land is being farmed, representing the best soils, but cultivating the remaining sparsely populated and often marginal 60 percent of land will require expensive farming techniques and new technology. Improved land management will likely spur per capita food increases in the developed countries.

PB82-197005 PC A09/MF A01
Central Labour Inst., Bombay (India).
The National Seminar on Quality of Working Life Held in Bombay on February 9-10, 1976
Feb 76, 188p
Sponsored in part by National Labour Inst., New Delhi (India).

Keywords: Quality of life, *Employment, Meetings, Developing countries, Job satisfaction, *Employee participation, *India, Interpersonal relations, Developing country application, Quality of worklife.

The Seminar was held to deliberate on the possibilities of improving quality of working life. Methods identified include participation in management, restructuring of work, enrichment of the job and improvement in working conditions and environment. The important aspect

is the satisfaction of the workers as regards his skill, personal ego and social relationships both inside and outside the enterprise.

PB82-198532 PC A04/MF A01
National Swedish Inst. for Building Research, Stockholm.
Financing Housing for Urban Low-Income Households in Africa: A Matter of Technical Building Codes
Jens Knocke. Feb 82, 69p Rept nos.
MEDDELANDE/BULL-M82:1, ISBN-91-540-9119-5

Keywords: Low income groups, *Housing, *Africa, Requirements, Building codes, Regulations, Construction management, Financing, Developing countries, Foreign technology.

The study is a discussion of the possible usefulness of research (and development) concerning technical regulations suiting the particular business of building houses for families with limited resources. Not regulations for the sake of regulating, but because codes could pave the way for conventional housing finance, on a large scale, for the average family in Africa. The report thus addresses itself to housing finance managers, and to others - civil servants, architects and engineers, and, of course, researchers - preoccupied by housing conditions in developing countries.

PB82-198565 PC A07/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
The Water Buffalo: New Prospects for an Underutilized Animal
Final rept.
1981, 128p
Contract AID/ta-C-1433, Grant AID/DSAN-G-0130
Library of Congress catalog card no. 81-83416.

Keywords: Livestock, Tropical regions, Developing countries, Research projects, *Animal husbandry, Reproduction(Biology), Comparison, Materials handling, Loads(Forces), Acclimatization, Tolerances(Physiology), Milk, Yield, Meat, Genetics, Rivers, Swamps, Distribution(Property), Bubalus bubalis, Water buffaloes, Underutilized species.

The water buffalo is an animal resource whose potential seems to have been barely recognized or examined outside of Asia. Throughout the world there are proponents and enthusiasts for the various breeds of cattle; the water buffalo, however, is not a cow and it has been neglected. The study indicates that the water buffalo could become an important resource in tropical, subtropical, and warm temperate zones in developing and developed countries. If this is the case, then it is clear that many countries should begin water buffalo research.

PB82-200056 PC A04/MF A01
Central Building Research Inst., Roorkee (India).
Functional Aspects of Building Design - Lecture Programme, New Delhi, 26-28 April, 1976
1976, 71p

Keywords: *Buildings, Structural design, Architecture, Esthetic properties, Illuminating, Daylighting, Ventilation, Windows, Thermal efficiency, Acoustics, Foreign technology.

A three-day lecture and discussion program on recent advances in architecture and functional designing of buildings was organized by CBRI. The text of the lecture delivered and discussions thereon are presented in this report. The lectures covered are: Architecture as Science; Shading Devices - Design and Applications; Design of Windows for Adequate Daylighting of Buildings; Design Aids for Natural Ventilation in Buildings; Thermal Design of Buildings in Different Climatic Zones; and Acoustic Treatment of Buildings.

PB82-200080 PC A03/MF A01
Central Road Research Inst., New Delhi (India).
Lime-Fly Ash Stabilised Soil for Road and Building Constructions
1979, 47p
Prepared in cooperation with Central Building Research Inst., Roorkee (India).

Keywords: *Roads, *Soil stabilization, Calcium oxides, Fly ash, Pavement bases, Subgrades, *Industrial wastes, Foreign technology.

This report is the result of a comprehensive collaborative study undertaken by Central Road Research Institute and Central Building Research Institute for stabilization of different soils with lime and flayash for use in the lower layers of pavement systems as bases/subbases in both roads and airfields, as well as manufacture of building blocks as an alternative to burnt clay bricks.

PB82-200106 PC A02/MF A01
Instituto Tecnico de Capacitacion y Productividad, Guatemala City.
Panificacion con Harinas Compuestas. (Making Bread with Mixed Flours).
Feb 80, 24p Rept no. INTECAP-81-006
Text in Spanish.

Keywords: Bread, Bakery products, *Guatemala, Mixtures, Flours(Food), Cereal products, France, *Food products, Spanish language, Yeasts, Peas, Potatoes, Cottonseed, Foreign technology, Cow peas, Cassava.

This is a compilation of formulae from a breadmakers course. Includes formulae for 6 types of french-breads, using mixtures of flours from cereals, as well as cowpea, soy, cotton seed, cassava and potatoes.

PB82-200114 PC A11/MF A01
Instituto Tecnico de Capacitacion y Productividad, Guatemala City.
Manual de Viveros Forestales. (Tree Nursery Practice Manual).
Jul 79, 232p
Text in Spanish.

Keywords: Forest trees, Reforestation, *Guatemala, Manuals, Site surveys, *Forestry, Planning, Management, Seeds, Planting, Water supply, Germination, Construction, Tropical regions, Spanish language, Foreign technology, Forest management.

Any community or individual wishing to have a tree nursery can find in this manual everything that is needed to know and do. Its contents go from the proper site selection to the administration including installation, sections, seed handling, planting and watering, and the use of local materials in its construction. Could be useful for agricultural extension workers and for forest management and reforestation courses.

PB82-200122 PC A06/MF A01
Central Designs Organisation, New Delhi (India).
Manual on Planning and Design of Reinforced Concrete Multistoreyed Buildings: Volume II
T. S, Vedagiri. 1978, 109p

Keywords: *Buildings, Reinforced concrete, Structural design, Foundations, Footings, *Concrete, Concrete slabs, Beams(Supports), Engineering drawings, Developing country application, Foreign technology.

This manual deals with the design and detailing aspects of reinforced concrete multi-storied buildings. The CPWD have designed and constructed a number of multi-storied buildings all over the country, and the expertise accumulated by the department in the course of years is reflected in the manual which outlines the procedure of design of various structural elements, illustrating the same with the worked out examples. Some of the tables and charts have been prepared on the basis of the Computer Cell of CDO. Specimen drawings appended to this Manual indicate the various structural details that are to be exhibited on working drawings.

PB82-200130 PC A09/MF A01
Instituto Tecnico de Capacitacion y Productividad, Guatemala City.
Agricultura Basica. (Basics in Agriculture).
Jun 79, 185p Rept no. INTECAP-81-003
Text in Spanish.

Keywords: *Guatemala, *Agriculture, Rural areas, Handbooks, Fertilizing, Mulches, Erosion control, Water supply, Cultivation, Plants(Botany), Pest control, Harvesting, Drawings, Spanish language, Ecology, Seeds, Foreign technology.

This handbook was conceived as an aid for rural people wishing to learn more about agriculture. It is written in simple, everyday language, to be understood at any level, but provides technical ideas for easy application. Its contents include the very basics of botany, seeds, ecology, soils, cultivation, fertilizers and pests control. It is heavily illustrated with drawings which compliment the explanations in the text.

PB82-200148 PC A03/MF A01
National Labour Inst., New Delhi (India).
Employment Creating Research, Alternative Strategies and Interventions: International Seminar
1980, 34p

Keywords: *Employment, Manpower utilization, *Employee participation, Meetings, Education, Research projects, Developing countries, Cooperation, Developing country application.

The International Seminar on 'Employment Creating Research, Alternative Strategies and Interventions' was organized by the National Labor Institute with the assistance of UNDP and ILO in New Delhi between February 19-23, 1980. This seminar was attended by 8 countries. Reports of 4 groups which discussed People's Participation and Education; Support Services; Support Organizations; and Linkages and Cooperation are presented.

PB82-200163 PC A10/MF A01
Central Public Health and Environmental Engineering Organisation, New Delhi (India).
Manual on Sewerage and Sewage Treatment (First Edition)
1980, 220p

Keywords: *Sewage treatment, Manuals, Design criteria, Performance evaluation, Sedimentation, Activated sludge treatment, Solid waste disposal, Foreign technology, Trickling filters, Chemical treatment, Developing country application.

There has been a long felt need for forging uniformity in planning, design and construction of sewerage and sewage treatment facilities. With this objective in view, this manual lays emphasis on the various pertinent aspects for execution of a comprehensive sewage collection and treatment scheme to serve the interest of the practicing Public Health Engineer. This manual has considered the recent technical advances and trends in the field of sewerage and sewage treatment. All units of measurements, operational parameters and design criteria have been furnished in the metric system. Other appendices contain useful information which will serve as a guide for solving the problems.

PB82-200338 PC A12/MF A01
Office of Technology Assessment, Washington, DC.
World Population and Fertility Planning Technologies: The Next 20 Years
Feb 82, 260p*
Library of Congress catalog card no. 82-600516.

Keywords: Population growth, Fertility, *Birth control, *Population control, Contraceptives, Developing countries, Technology innovation, Research projects.

This report covers the status of current and projected technologies that affect fertility change. It presents current projections for population growth to 2000 and the implications of this growth; identifies the determinants of fertility change; reviews current reproductive research and contraceptive R and D; discusses the factors that influence the acceptance, distribution, and use of fertility planning technologies in the less developed countries; and examines past and current U.S. funding arrangements in support of population assistance requests from less developed countries.

PB82-200544 PC A08/MF A01
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Food, Fuel, and Fertilizer from Organic Wastes
Final rept.
1981, 165p* Rept no. CIR/BOSTID/31
Contract AID/ta-C-1433, IAD/DAN-5538-G-00-1023
Library of Congress catalog card no. 81-84731.

Keywords: *Food, *Fuels, *Fertilizers, Organic wastes, Meetings, Utilization, Economic factors, Operating costs, Capitalized costs, Manpower, Rural areas, Rice plants, Developing countries, Plant residues(Organic), Industrial wastes, Technology innovation, *Agricultural wastes, Foreign technology.

This report examines some of the opportunities for the utilization of organic wastes and residues commonly found in the poorer rural areas of the world. It is based on discussions and presentations at a panel meeting of the Advisory Committee on Technology Innovation held on 6-8 August, 1979, in Airlie, Virginia, USA. The purpose is to set forth in array of alternatives for possible application where existing waste usage (or nonusage) is no longer appropriate. The processes described range from simple and inexpensive techniques to those more complex and costly. Many are already in use in rural areas, but some are still being developed at universities and research institutes. Although there are some generalizations on economic factors, projections of operating and capital costs in vastly different environments are impossible. Most of the processes described are both labor intensive and site sensitive.

PB82-200981 PC **A10/MF A01**
Intermediate Technology Publications Ltd., London (England).
Planificacion Financiera para el Pequeno Contratista Constructor (Financial Planning for the Small Building Contractor),
Derek Miles. c1982, 224p
Text in Spanish.

Keywords: *Financial management, *Construction, Contractors, Planning, Scheduling, Cash flow, Investments, Billing, Accounting, Capital, Cost engineering, Resource allocation, Financing, Project management, Labor estimates, Materials estimates, Budgeting, Developing countries, Translations, *Small businesses, Developing country application.

The material on which this report is based was prepared for a course on Regional Management on Building in Africa. It is the result of the experience of helping during 10 years small constructors to establish and manage their business. It deals with the timing of the construction and its costs, in relation with the economy of the country. It includes: the planning of the work to accomplish in the year, programmation and balance of resources, how to ask for a loan, how to invest the capital, control of debtors, utilization of the techniques of research studies.

PB82-200999 PC **A11/MF A01**
Intermediate Technology Publications Ltd., London (England).
Contabilidad y Teneduria de Libros para el Pequeno Contratista Constructor (Accounting and Bookkeeping for the Small Building Contractor),
Derek Miles. c1982, 237p
Text in Spanish.

Keywords: Accounting, *Construction, Contractors, Developing countries, Records management, Assets, Liabilities, Fixed investment, Capitalized costs, Depreciation, Profits, Losses, Construction costs, *Financial management, Translations, *Small businesses, Developing country application.

The material on which this report is based was prepared for a Regional Course in Management Building in Africa. It emphasizes ideas and useful techniques that the reader may apply to increase his knowledge and control over his business. Most of these ideas and techniques apply to the management of agencies of public works as well as to the administration of the private building constructor. It contains: the construction contracts as a financial transaction, documentation and organization in the office, basic bookkeeping, depreciation, balance sheets, accounts of gains and losses, comparison of accounts. Included also is a chapter on practical exercises, charts and illustrations.

PB82-202607 PC **A03/MF A01**
Transport and Road Research Lab., Crowthorne (England).
The Performance of High-Flow Bus Lanes in Bangkok
N. W. Marler. c1982, 38p Rept no. TRRL-Supplementary-723
Also pub. as ISSN-0305-1315.

Keywords: Urban transportation, *Roads, *Transportation management, *Buses(Vehicles), Vehicular traffic control, Developing countries, *Thailand, Travel time, Highway transportation, Bangkok(Thailand), Traffic lanes, Bus lanes.

Bus lanes are a useful traffic management measure in Third World cities, particularly as the use of buses is high and often rising. Bus lanes are typically expected to reduce congestion and shorten bus journey times, but there is usually little attempt to monitor their full impacts. Bus lanes were introduced in Bangkok in 1980. Surveys carried out on six diverse sections, before and after the event, showed that in almost all cases, either bus travel times or car travel times, or both, were improved significantly. The most successful section showed improvements to both bus and car mean travel times of 25-3 per cent. The bus flows observed in the study were very high, with up to 250 stateowned buses and 150 private minibuses using a single bus lane in an average peak hour.

PB82-204157 PC **A03/MF A01**
National Labour Inst., New Delhi (India).
Adaptation of Traditional Systems of Agriculture in a Developing Economy: Some Reflections on the Indian Gestalt
Nitish R. De. Sep 77, 33p Rept no. OP/SER-2/77

Keywords: *Agricultural economics, Rural areas, Industries, Improvement, *India, Quality of life.

The paper presents a case for exploration of rural development, 'Walking on two legs'. With a few exceptions, the rural leg has so far been hampered by reliance on impressive, modernized industrial conglomerates which have transformed agriculture into a sophisticated industry. The paper identifies some dimensions of rural development and suggests ways to improve the quality of agrarian life.

PB82-205352 PC **A05/MF A01**
Planning Commission, New Delhi (India).
Accessibility of the Poor to the Rural Water Supply: A Quick Evaluation Study 1978-79
1980, 76p

Keywords: Accessibility, *Water supply, Rural areas, *India, Income, Potable water, Distribution systems, Water distribution, Pipes(Tubes), Water wells, Developing country application.

With a view to undertaking an extension of benefits accruing to the poor under the Rural Water Supply Scheme, the Program Evaluation Organization, at the instance of the Planning Commission undertook a 'Quick Study'. The study was conducted in 17 major states in India covering 34 districts and as many Community Development Blocks. For a detailed investigation, a total of 99 villages and 1,174 poor households were selected. The study has brought out that although the poor have been benefitted by the drinking water provided mainly through the piped water and bored/tube/drilled wells under the MNP/ARP, their share in relation to the non-poor has been less.

PB82-205576 PC **A12/MF A01**
Hindustan Paper Corp. Ltd., New Delhi (India).
An Assessment for the Possibilities for the Use of Agriculture Residues,and Some Nonwood Plant Fibres for the Manufacture of Paper, Paperboard and Newsprint in India
Working document 21
T. T. Colline, Jr. Jan 78, 252p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: Plant residues(Organic), Pulping, *Agricultural wastes, Bagasse, Straw, Economics, *Pulp, *India, *Paper industry, Assessments, *Paper, Newsprint, Paperboards, Developing country application.

The objective of this study is to list, to explore the availability of, and to assess the economic and technical viability of collecting and pulping the major agriculture residues and non-wood plant fibres (except of bamboo) in India. The fibrous raw materials reviewed are bagasse; jute and mesta fibers, stalks, and sticks; rice and wheat straw; reeds; areca nut fibrous wastes; groundnut shells; and miscellaneous nonwood plant fibres and agricultural residues of crops grown in India. The need and possibilities for spent liquor recovery systems for small mills pulping agricultural residues and nonwood plant fibres are also discussed.

PB82-205584 PC **A04/MF A01**
United Nations Development Programme, New Delhi (India).
Exploration and Identification of Alternative Raw Materials for Paper and Newsprint Manufacture; General Research Programme
Working document no. 13
W. H. Alqar. Sep 76, 72p

Keywords: *Paper industry, Newsprint, Manufacturing, Substitutes, Chemical pulps, Black liquors, *Paper, *Bamboo, *Reed, *Pulp, Developing country application.

The report presents twelve research programs in connection with the exploration and identification of alternative raw materials for paper and newsprint manufacture. Among these, two programs, namely, 'chemical pulps for newsprints from reeds, bamboos, and softwoods' and 'evaporation and burning properties of black liquor' are described in greater detail.

PB82-205675 PC **A04/MF A01**
Agency for International Development, Washington, DC.
Honduras Rural Roads: Old Directions and New
Project impact evaluation rept. no. 17
John Hamilton, Norman M. Chapin, and Michael C. DeMetre. Jan 81, 57p Rept no. AID-PN-AAH-971

Keywords: *Roads, Rural areas, *Honduras, Developing countries, Development, Agriculture, Farm crops, Productivity, Mobility, Developing country application.

Honduras has the lowest ratio of roads to area and population in all of Central America. To assist Honduran road construction, A.I.D. developed two roads approaches differing in inputs and impacts. In 1965, A.I.D. approved a project to build feeder roads in areas isolated from marketplaces on the 'trickle-down' theory that the roads would benefit rich and poor alike, lead to cash crop production, and reduce subsistence farming and cattle ranching. The project called for road construction with no complementary credit, extension, or marketing services. Case studies of two of the feeder roads showed that the roads stimulated the cultivation of additional land, the production of cash crops, and also improved local access to medical and educational services. Project benefits varied, however, depending on external factors.

PB82-206194 PC **A07/MF A01**
Planning Commission, New Delhi (India).
Report of the Working Group on Energy Policy
1979, 129p

Keywords: *India, Energy policy, Energy demand, Energy supplies, Energy consumption, *Energy.

This document presents, in detail, the report of the 'Working Group on Energy Policy' set up by the Government of India in December 1977. It gives an estimate of the prospective energy demand in different sectors of the economy for a decade; it surveys the present and prospective supplies of energy; it recommends measures for optimum use of available energy resources; and finally it outlines the future national energy policy for the country. The specific subjects covered by the report are: Trends in energy consumption; Forecast of demand for energy; Energy resources in India; Energy in the household sector; Energy in agriculture sector; Energy in industries sector; Energy in the transport sector; Policy for the power sector; Oil policy; Coal policy; Rural energy policy; Costs and prices in the energy sector; and Research and development in the energy sector.

PB82-206418 PC **A11/MF A01**
Grupo de Tecnologia Apropiada, Panama City.
Como Hacerlo y Hacerlo Bien - Manual de Gestion de Proyectos. (Do It Right the First Time: A Manual for Project Design.)
Oct 81, 248p
Text in Spanish.

Keywords: Project planning, *Panama, Developing countries, Organizations, Disadvantaged groups,

Handbooks, *Management training, Developing country application.

This Handbook on Appropriate Management Techniques represents a working tool for those individuals and organizations responsible for designing, implementing and evaluating projects within Private Voluntary Organizations (PVOs) working in development projects. Its content includes guides, case studies, information sources, funding sources and basic explanations to motivate and encourage the user to plan, evaluate and, in general, to better the content, presentation and control of their own projects. Although the examples given in the Handbook are related to the Panamanian reality, the content can be applied to every private -or even public- organization working through development projects to alleviate the conditions of the poor segments of societies in less developed countries.

PB82-206517 PC **A02**/MF **A01**
National Inst. of Nutrition, Hyderabad (India).
Lathyrism: A Preventable Paralysis
1981, 20p
Sponsored in part by Indian Council of Medical Research, New Delhi (India).

Keywords: Paralysis, Nervous system disorders, Grains(Food), Toxicity, Toxic diseases, Males, Youths, *Diseases, *Food supply, Preventive medicine, Developing countries, Recommendations, *India, Food, Diets, Lathyrism, Toxins, Developing country application, Lathyrus sativus.

Lathyrism is a nervous disease that cripples man, especially young men between the ages of 15 and 45 years. The report points out that the disease is caused by eating large amounts of pulse Lathyrus sativus. The toxin in Lathyrus sativus has been isolated. The harmful nature of this toxin is revealed by injecting small amounts of it into animals. It is suggested that in order to avoid the toxic effect, Lathyrus sativus should never form more than a quarter of the total amount of cereals and pulses eaten per day. Some simple preventive measures to destroy the toxin are also suggested.

PB82-206556 PC **A04**/MF **A01**
Indian Council of Medical Research, New Delhi.
Recommended Dietary Intakes for Indians
K. T. Achaya, S. Mahtab Bamji, and K. L. Mukherjee.
1981, 75p

Keywords: Diets, *India, Proteins, Fats, Iron, Calcium, Food, Developing countries, Formulations, *Food supply, Developing country application.

This report includes the deliberations and recommendations on desirable intakes of energy, proteins, fats, iron, calcium, and vitamins given by a committee constituted by the Indian Council of Medical Research. A balanced diet formulated by using the linear programming technique to arrive at the least-cost formulations is also included.

PB82-206574 PC **A04**/MF **A01**
National Buildings Organisation, New Delhi (India).
Housing Construction Techniques and Termite Control: Precast Cellular Unit Floor/Roof for Low Cost Housing
Jul 78, 56p

Keywords: Residential buildings, Precast concrete, Cellular materials, Roofs, Floors, Structural members, *Buildings, *Houses, Structural members, Reinforced concrete, Bricks, Termites, Developing country application, Low cost housing.

This series of reports covers precast cellular unit floor/roof for low cost housing, precast RC channel units for low cost housing, RCC frames for doors and windows, brick cavity walls (using common burnt clay bricks), and termite control in buildings. All the reports are written in simple English and contain clear drawings and charts to help the home builder.

PB82-206590 PC **A03**/MF **A01**
Hindustan Paper Corp. Ltd., New Delhi (India).
Properties of Blends of Eucalypt Cold Soda Pulps and Eta Reed Chemical Pulps
Research progress rept. no. 17
T. C. Mantri, V. Raghunath, Y. K. Sharma, Y. K. Sood, and K. S. Moorthy. Apr 80, 30p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: Chemical pulps, Newsprint, Impregnating, Sodium hydroxide, Physical properties, *Paper industry, *Reed, *Pulp, *India, Cold soda pulps, Eucalypt species, Developing country application.

The properties of blends of eucalypt cold soda pulp and eta reed chemical pulps were evaluated for newsprint furnish. Impregnation with sodium hydroxide before refining produced high yield cold soda pulps from a mixture of eucalypt species, viz., E. grandis, E. tereticornis, and brightness values in the range 59.8% to 63.4%. Handsheets from blends of bleached cold soda pulps from eucalypts and bleached eta reed chemical pulp had satisfactory physical properties but opacity was rather low.

PB82-206616 PC **A03**/MF **A01**
Hindustan Paper Corp. Ltd., New Delhi (India).
Bleaching Studies on Commercial Bamboo Pulp Using Chlorine Dioxide
Research progress rept. no. 9
R. Pant, N. R. Mohan Rao, Rajeev Mohan Mathur, P. P. Bhola, and T. K. Roy. Apr 79, 27p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: *Bamboo, Bleaching, Chlorine oxides, Brightness, *Pulp, *Paper industry, *India, Developing country application.

Bleaching studies were conducted on a commercial bamboo pulp using various bleaching sequences, with an objective of attaining a maximum brightness of 87% G.E. of the bleached pulp. It was observed that a maximum brightness of 87.2% Elrepho (Equivalent to approx. 89-90% G.E.) could be achieved by using the CEHED bleaching sequence.

PB82-206632 PC **A10**/MF **A01**
National Inst. of Nutrition, Hyderabad (India).
Nutritive Value of Indian Foods
C. Gopalan, B. V. Rama Sastri, and S. C. Balasubramanian. 1980, 214p

Keywords: *Food, *India, *Nutrition, Diets, Nutritional deficiency diseases, Children, Pregnancy, Developing countries, Developing country application.

A brief outline of general principles and considerations that govern the planning of satisfactory diets is given in this book. In the section dealing with dietary principles, information is given on the importance of the various nutritional constituents that are present in foodstuffs. The dietary allowances for various nutrients as recommended by nutrition experts are discussed in the next section; and typical balanced diets that satisfy the nutritional requirement of persons belonging to different age and sex groups are suggested. The prevalent Indian diets are known to be deficient in some important nutrients, and therefore hints on improving the nutritive value of the present diets are also given. The effects of malnutrition in different segments of the population are then briefly discussed. Pregnant and lactating women and also young children are particularly prone to suffer from malnutrition. This point is emphasized, and practical suggestions involved in the nutritional care of these segments of the population are indicated. Available information on the composition of Indian foods is given in the Tables that follow the text. An appendix at the end gives the names of the common food-stuffs in Indian languages.

PB82-206673 PC **A03**/MF **A01**
National Dairy Research Inst., Karnal (India).
The Karnal Sahiwal and Red Sindhi Cows
D. S. Bhatnagar, R. C. Sharma, M. Gurnani, and D. Sundaresan. 1979, 48p

Keywords: Dairy cattle, *India, Tropical regions, Breeding, *Milk, *Dairies, Production, Fats, Weight(Mass), Growth, Cost analysis, Reproduction(Biology), Mortality, Survival, Developing country application, Inbreeding.

Sahiwal and Red Sindhi cattle are milch cattle with high yielding potential, heat tolerance, and disease resistance, best suited to the tropical climate prevailing in India. Bred at many Indian Military and other state farms for milk production, the best strain of Sahiwal breed has an average 305 days lactation yield of 2100 kg., and individual highest of 4433 kg. The report describes the following work done on these strains: breeding policy, birth weight and growth rate, cost of calf rearing, productive performance of the herds, cost of milk production, fat and SNF contents, reproductive performance, effect of inbreeding coefficient on production, reproduction and survivability traits, mortality rates, and progeny testing of bulls.

PB82-206681 PC **A08**/MF **A01**
National Dairy Research Inst., Karnal (India).
Dairy Goats at Karnal
D. S. Chawla, D. S. Bhatnagar, and D. Sundaresan.
1981, 120p

Keywords: *Dairies, Goats, *India, Genetics, Growth, Reproduction(Biology), *Milk, Animal behavior, Meat, Animal diseases, Mortality, Waste disposal, Immunology, Developing country application.

The report describes research work done on the development of new breeds of dairy goats with a high potential of milk production. The productive performance, body dimension and growth, reproductive performance; and behavior of the new breeds are given in the report. Topics concerned with the immunological and cytogenetic investigation, meat production, general management, economic effectiveness, diseases and mortality and disposal of milk and animals are also covered.

PB82-206699 PC **A16**/MF **A01**
National Dairy Research Inst., Karnal (India).
National Dairy Research Institute: Annual Report 1980
M. S. Srivastava. 1980, 369p

Keywords: *Dairies, *India, Dairy products, Management, Dairy cattle, Goats, *Milk, Chemical analysis, Microbiology, Economic factors, State government, Education, Services, Dairy cattle, Animal nutrition, Developing country application, Buffaloes.

The history, facilities, organization, major activities, products, and finance situation in the National Dairy Research Institute, Karnal, India are described. Highlights of research in the fields of dairy production, basic and comparative nutrition, milk processing, dairy products, and the management of the Institute are listed.

PB82-206707 PC **A06**/MF **A01**
National Inst. of Family Planning, New Delhi (India).
Biomedical Research in Family Welfare Planning
Somnath Roy, R. P. Das, and S. K. Basu. Oct 76, 103 Rept no. MONO/SER-26

Keywords: Fertility, Genital diseases, Demography, Research, Developing countries, *India, *Birth control, Developing country application, Family planning, Contraception, Genetics, Contraceptive devices, Vasectomy, Intrauterine devices.

The report is a comprehensive review of the biomedical research work pertinent to family planning being done in the National Institute of Family Planning in India in the past years. Significant progress made in the following areas are described in detail: (1) Studies on physiology of reproduction and contraception; (2) Studies on infertility and other reproductive and associated disorders; (3) Medical genetic studies; topics covered include male and female contraceptive pills, vasectomies, condoms, IUD's, Lippes Loops, and (4) Population genetic studies.

PB82-206723 PC **A05**/MF **A01**
Agency for International Development, Washington, DC.
The Impact of Irrigation on Development: Issues for a Comprehensive Evaluation Study
Program evaluation discussion paper no. 9
Leonard Berry, Richard Ford, and Richard Hosier.
Oct 80, 87p Rept no. AID-PN-AAJ-208

Keywords: Economic development, *Irrigation, Design, Project planning, Evaluation, History, Salinity, Agriculture, Production, Assessments, Developing country application.

Although irrigation can greatly improve the world's capacity to feed itself by increasing agricultural production, most irrigation projects fall short of this goal.

These failures are due sometimes to defective design, but more often to the expense involved, poor management and leadership, and improper use of resources. A sound system of evaluation can improve the effectiveness of these projects. This report examines A.I.D.'s current evaluation process and recommends revisions to improve project design. After reviewing the current status of irrigation in the developing world, the authors discuss A.I.D.'s evaluations, which typically concentrate on a project's conformity to its original purpose or on the performance of the implementing agency.

PB82-206731 PC A04/MF A01
Agency for International Development, Washington, DC.
Bolivia: Rural Electrification
Project impact evaluation rept. no. 16
Edward Butler, Karen M. Poe, and Judith Tendler.
Dec 80, 58p Rept no. AID-PN-AAH-978

Keywords: *Electric power, Rural areas, *Bolivia, Developing countries, Evaluation, Economic impact, Social effect, Quality of life, Developing country application.

Two rural electrification systems initiated in Bolivia in 1973 and 1974 are the subject of this report. By 1979, all distribution networks were completed, except in the La Paz region. Power was supplied to 42,000 consumers and was used primarily for residential lighting. Although demand outpaced supply, consumption per household was lower than projected, and irrigation and industrial use was negligible. The preponderant positive impact of the projects was social. Household lighting improved the physical quality of life for 7% of Bolivia's rural population.

PB82-206749 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
Quantitative Analyses of Lesotho's Official Yield Data for Maize and Sorghum
Research rept.
Jerry Eckert. Jul 80, 38p LASA/RR-8, AID-PN-AAH-922
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Corn plants, Grain sorghum plants, Rainfall, Farm crops, South Africa, Yield, Estimating, *Crops, Statistical analysis, Accuracy, Developing country application, Maize, *Lesotho.

Crop yield estimates computed by Lesotho's Bureau of Statistics have undergone considerable scrutiny recently. The Bureau's data seem unreliable, showing a long-term decline in yields, a high degree of variability both within each year and between districts, and, in 1976/77, a jump of more than 50% over earlier averages. Climate fluctuation, however, heavily influences cropping patterns in Lesotho and may account for these anomalies. This paper analyzes, at the macro-data level, the relationships between crop yields and rainfall in Lesotho and develops mathematical equations to estimate maize and sorghum crop yields.

PB82-207010 PC A04/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
A Critical Analysis of Manpower Utilization Issues in Lesotho
'M'ampiti Francisca Nchapi. Aug 80, 55p LASA/RR-9, AID-PN-AAH-921
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Manpower utilization, *Lesotho, Personnel, *Employment, *Migration, Agriculture, Mining, Income, Specialized training, Developing country applications.

According to a recent study, the supply of labor requiring employment within Lesotho's economy will increase to 900,000 persons between the years 1976 and 2000, with 93,000 agricultural jobs needed in the next 5 years and over 100,000 such jobs required in each of the following 5-year periods. Development of an effective manpower utilization strategy is thus crucial in solving Lesotho's employment dilemma. This paper reviews an agriculturally-based, employment-intensive theory of development and applies it to the case of Lesotho, critically examines existing data and analyses on the employment situation, and formulates broad policy implications for the Government of Lesotho. The author delves into the major dimensions of Lesotho's manpower utilization. These issues include rural-urban migration; the magnitude of labor surplus or shortage; migration into South Africa and miners' incomes; growth of the labor supply during the years 1980-2000; and labor-intensive technologies and labor absorption. It is demonstrated that while the agricultural sector must be developed as the primary employer of returning migrants, the industrial and public works sectors also have an important role in this regard. Recommendations are made in the areas of agricultural production and marketing, import and export substitution, expansion of industry from urban areas, distribution of improved social services to village people, transfer of technology to small farmers and local personnel, and the quantity and quality of training.

PB82-207028 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
The Future Environment for Agricultural Planning: 1980-2000 AD
Jerry Eckert, and Joseph N. Mohapi. Jun 80, 37p LASA/DP-9, AID-PN-AAH-920
Prepared in cooperation with Colorado State Univ. Fort Collins. Dept. of Economics.

Keywords: South Africa, *Agricultural economics, Population growth, Rural areas, Manpower, Rainfall, Farm crops, Yield, Roads, Mountains, *Employment, Law(Jurisprudence), Allocations, Farms, Trends, Developing country application, *Lesotho, Land Act of 1979.

Because the dominant factors affecting Lesotho's overall economic development are also those which affect the agricultural sector, characterization of these factors would provide agricultural planners with the economic environment around which their long term programs and policies should be based. Providing such a characterization, this analysis predicts major problems confronting economic planners that may occur in the absence of a well-defined and implemented development strategy.

PB82-207051 PC A02/MF A01
International Rice Research Inst., Los Banos, Laguna (Philippines).
Specific Soil Chemical Characteristics for Rice Production in Asia
Research paper series
F. N. Ponnamperuma. Dec 78, 22p IRPS-2, AID-PN-AAH-909

Keywords: Soil properties, *Rice, *Asia, Production, Flooding, Population growth, Drying, Arid land, Semiarid land, *Soils, Developing country application.

Although more than 80% of the world's rice is grown and consumed in Asia, increased production is required to keep pace with population growth. Since the extent of arable land in this densely populated region is limited, additional rice cultivation must take place in lands that remain uncultivated largely because of soil problems. To evaluate potential rice lands, an understanding of the specific properties of flooded soils and of the physiology of the rice plant is necessary, because the chemical changes induced in flooded soils drastically alter the criteria used to evaluate land for dryland farming. This report examines the nature of these changes.

PB82-207069 PC A03/MF A01
Agency for International Development, Washington, DC.
Rural Roads in Thailand
Project impact evaluation no. 13
Frank J. Moore, Charles T. Alton, H. Leedom Lefferts, Suthep Soonthornpasuch, and Richard E. Suttor. Dec 80, 50p Rept no. PN-AAH-970

Keywords: *Roads, *Thailand, Rural areas, Developing countries, Public works, Local government, Economic impact, Developing country application.

Nearly 30 million people in the formerly isolated villages of North and Northeast Thailand have benefited from the 8,000 miles of roads built between 1964 and 1974 under the Accelerated Rural Development (ARD) Project. This report focuses on the impact of ARD on Thais who experienced for the first time a wide range of opportunities within and away from their home community. ARD's institutional objective was to increase the capability of provincial governments to respond to rural needs by delegating to local governors the responsibilities of planning, designing, building, and maintaining rural roads, water facilities, and other public works. The roads have generally impacted favorably on those in formerly isolated areas.

PB82-208190 PC A03/MF A01
Lesotho Agricultural Sector Analysis Project, Maseru.
South African Mine Wages in the Seventies and Their Effects on Lesotho's Economy
Research rept.
Jerry Eckert, and Ron Wykstra. May 80, 33p LASA/RR-7, AID-PN-AAH-871
Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Economics.

Keywords: Mining, Income, South Africa, Economic developing, Manpower, Economic impact, *Migration, *Employment, Developing country applications, *Lesotho.

During the period January 1973-June 1976, the mining industry of the Republic of South Africa increased mine wages by an unprecedented 500 percent to attract higher numbers of South Africans to mining jobs, thereby reversing South Africa's dependence on foreign labor. The economic impacts of such a reversal were severe, particularly in Lesotho, South Africa's prime source of migrant labor. This paper quantifies the more important of these impacts in order to identify the causes of major economic developments in Lesotho and to suggest the magnitude of economic difficulties that may occur if migration opportunities continue to diminish.

PB82-208349 PC A03/MF A01
Development and Consulting Services, Butwal (Nepal).
Preliminary Trails of Cement-Gobar Gas Plant Designs
David J. Fulford, and Nick Peters. Jul 81, 41p

Keywords: *Cement, *Gas storage, Design criteria, Cost analysis, *Bioconversion, *Nepal, Biogass process, Developing country application.

One way to reduce the cost of bio-gas plants is to use cement to make gas storage domes, instead of steel. A total of 7 different designs of cement bio-gas plants have been made and tested. Both floating ferrocement gas drum designs and fixed dome displacement digesters were built, with varying success. Details are given of construction techniques, costs and effectiveness of these various designs. The two most effective designs of the seven were a displacement digester (Chinese design) with a cement gas dome and a design that used a floating hemispherical ferrocement gas dome. Both showed significant savings (35%) in materials cost over a steel drum (Indian) design although some of this saving was offset by increases in labor costs.

PB82-208380 PC A02/MF A01
Central Food Technological Research Inst., Mysore (India).
A Comparative Evaluation of Some Storage Bins for Rural Grain Storage
T. S. Krishnaumurthy, and S. K. Majumder. 1978, 18p

Keywords: *Grains(Food), *Food storage, Bins, *India, Thermal conductivity, Moisture, Condensation, Termites, Rodents, Insects, Cost analysis, Plywood, Polyethylene, Metals, Panels, Ferrocements.

The main requirements for sound storage of food grains are that their moisture content should be below 11 percent and that they should be free from internal infestation. Grain storage structures should therefore have (1) low thermal conductivity to prevent moisture condensation in stored grain, (2) gas-worthiness for fumigant retention, (3) resistance to rodent and termite attack, and (4) resistance to cross-infestation by insects. A comparative evaluation of plywood, ferrocement and high molecular weight high density polyethylene bins of capacity 0.5 to 3 tons showed that the plywood and ferrocement bins meet these requirements both for indoor and outdoor storage of grains.

PB82-208539 PC A03/MF A01
Indian Council of Medical Research, New Delhi.

Review of Work Done on Rural Water Supply in India
Technical rept.
S. J. Arceivala. 1972, 39p Rept no. ICMR/TR-SER-19

Keywords: *Water quality, *Water supply, *Water wells, Rural areas, Public health, Fluoridation, Iron, Manganese, Disinfection, *India, Pumps, Maintenance.

The report summarizes the progress made in rural water supply and the problems encountered in India since 1947. It describes the improvement in health as a result of community water supply, and reports the studies done on tube-wells and the maintenance of hand-pumps fitted to tube-wells in rural areas.

PB82-208661 PC A05/MF A01
Indian Council of Medical Research, New Delhi.
Studies on Weaning and Supplementary Foods
Technical rept.
C. Gopalan. 1974, 84p Rept no. ICMR/TR-SER-27

Keywords: Infants, *Children, *Food supply, Planning, Rural areas, Developing countries, India, *Nutrition, Weaning, Developing country application, Feeding behavior, Poverty groups.

The report is the result of a comprehensive study on infant and child feeding practices carried out in six different regions of India, under the auspices of the Indian Council of Medical Research. The main aims of this study are: (1) to collect data regarding the feeding patterns and weaning practices among the poor socio-economic groups and (2) to develop suitable weaning foods from locally available resources and to devise appropriate methods of evaluating and popularizing them among the communities.

PB82-208794 PC A11/MF A01
Texas Univ. at Austin. Center for Research in Water Resources.
Appropriate Technology for Planning Hydroelectic Power Projects in Nepal: The Need for Assumption Analysis
Technical rept.
Charles G. Chandler. c1981, 231p Rept no. CRWR-182

Keywords: *Hydroelectric power, *Nepal, Electric power generation, Developing countries, Foreign countries, Feasibility, Planning, Developing country application, Appropriate technology.

This report describes and analyzes planning for hydropower development in Nepal. The objectives of the study are: To conduct an assessment of hydropower project planning in Nepal; To discuss the planning process from the perspective of an engineer seeking to improve it; and To categorize the problems and suggest solutions.

PB82-208828 PC A09/MF A01
Missouri Univ.-Columbia.
Tanzania Seed Industry Survey: Report of Evaluations and Recommendations
Albert R. Hagan, Robert J. Bevins, Loyd E. Cavanah, and John M. Poehlamn. Apr 79, 187p AID-PN-AAH-870
Contract AID/afr-c-1139

Keywords: *Seeds, Industries, *Tanzania, Surveys, Production, Processing, Distribution(Property), Erosion control, Constraints, Farms, Developing country application.

The production of high quality seeds of improved and adapted crop varieties is essential for economic improvement of Tanzania's agricultural sector. This report presents the findings of a survey of the components of Tanzania's modern seed industry: breeder seed research development; expansion of pure lines of improved varieties by foundation seed farms (FSF); certified seed production, processing, and primary distribution by Tanzania Seed Certification Agency (TANSEED).

PB82-209123 PC A08/MF A01
National Inst. of Family Planning, New Delhi (India).
Annotated Bibliography on Family Planning Communication
Uma Chowdhury. 1970, 164p Rept no. MONO/SER-4

Keywords: Bibliographies, Communicating, Mass media, Publicity, Attitudes, Social effect, Developing countries, *Birth control, India, Foreign technology, Developing country application, Family planning.

This report deals with a selected bibliography for family planning communications research under the sponsorship of the Ministry of Health, Government of India. It presents the materials collected during the latter part of 1962 for the purpose of preparing a carefully selected bibliography for family planning communications research. During this period a brief survey was also undertaken to collect relevant information about the research activities of the specialized centres for communications research mainly with a view to adapting the allied research problems.

PB82-209131 PC A07/MF A01
National Inst. of Family Planning, New Delhi (India).
Adoption of a New Contraceptive in Urban India
Dinesh Chandra Dubey. 1969, 140p Rept no. MONO/SER-6

Keywords: Demography, Mass media, Publicity, Communicating, Social effect, Attitudes, *Birth control, Developing countries, *India, Contraceptive, Developing country application, Family planning, Intrauterine devices.

The book analyzes the communication and family decision making processes involved in the adoption of the Intra-uterine Contraceptive Device. The main findings were that women were more aware of IUD information than men and that women tended to get their information from personal sources while men tended to get theirs from the mass-media. Both husband and wife took part in decision making regarding the use of the IUD.

PB82-209149 PC A02/MF A01
Indian Plywood Industries Research Inst., Bangalore.
Timber and Timber Products in Structural Uses
H. N. Jagadeesh, and M. K. Radhamani. 1977, 14p

Keywords: *Wood products, Structural timber, Structures, Plywood, Panels, Wood preservatives, Savings, Reliability, *Wooden structures, Shortages, Adhesives, Cost analysis, India, Developing country application, Hardboards.

Development of timber engineering techniques at some of the Research Organizations of the country amply demonstrates the possibility of saving considerable quantities of timber without sacrificing structural efficiency. Nailed construction techniques and glued plywood techniques offer a wide range of solutions to design and construct structures applicable to present day building practice. Use of wood based panel materials, in particular plywood and hardboard, can considerably bring down the pressure on supplies of seasoned and preservative treated timber.

PB82-209677 PC A08/MF A01
National Research Council, Washington, DC.
The Estimation of Recent Trends in Fertility and Mortality in Egypt
Rept. no. 9 (Final).
1982, 161p Rept no. ISBN-0-309-03238-5
Library of Congress catalog card no. 81-86662.

Keywords: Mortality, Fertility, *Egypt, Vital statistics, Population growth, Demography, Populations, Trends, Women, Developing countries, Metropolitan areas, *Population control, Infant mortality.

This report is one of a number designed to examine levels and trends of fertility and mortality in the developing world. In Egypt, beginning in the 1940s, infant mortality and crude death rate began an extensive decline. Both mortality and fertility rates vary by region in Egypt, and the report examines the following rates: infant mortality, general fertility, overall fertility, marital fertility, and the proportion married among women of childbearing age. A reduction in fertility in Egypt between 1960 and 1976 was found to be caused by later marriage and a small decrease in marital fertility. These declines began sooner and were larger in large metropolitan areas.

PB82-209743 PC A05/MF A01
Indian Plywood Industries Research Inst., Bangalore.
Plywood for Houses - Some Papers
H. N. Jagadeesh, H. Guruva Reddy, and Joseph George. Jun 78, 77p

Keywords: Residential buildings, Prefabrication, *Plywood, Glued joints, Bolted joints, Fabrication, Roofs, Veneers, *Houses, *India, Adhesives, Developing country application.

This is a compilation of some of the papers prepared by the Indian Plywood Industries Research Institute on utilization and other aspects of plywood for houses. The papers covered are: Veneer Roof for Rural and Low Cost Houses; A Prefabricated Plywood House; A Low-Cost Partially Prefabricated Plywood House: Partial Replacement of Phenol in Phenol Formaldehyde Resin Adhesive: Part I. The use of Lignocellulosic Materials; Glued Plywood Two Hinged Type Arch Panel Roofing and Glued Spliced and Bolt Plywood Joints for Load Bearing Construction; and a Partially Prefabricated Low-Cost Hardboard House.

PB82-210790 PC A02/MF A01
Indian Plywood Industries Research Inst., Bangalore.
Grain Storage Bins of Plywood
H. N. Jagadeesh, V. Padmini, and Joseph George. 1976, 15p

Keywords: Bins, *Plywood, Grain crops, *Food storage, *India, Standards, Weight(Mass), Termites, Flexural strength, *Grains(Food), Stiffness, Fumigation, Moisture, Rodents, Damage, Cost effectiveness, Weather, Developing country application.

Exterior grade plywood is a versatile engineering material. It has high strength-weight ratio, and is completely weather-proof, water-proof, decay resistant, and insect and termite-proof. Theoretical and experimental studies at the India Plywood Industries Research Institute have shown that it is possible to make grain storage bins of any capacity in the range 0.1-60 tones or more from exterior grade plywood using nail gluing technique. Structurally, plywood bins have high strength and stiffness. Functionally, plywood bins can be made practically gas-tight to facilitate fumigation and to prevent moisture entry.

PB82-210816 PC A02/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Raising Table Poultry
Sohan Singh Saint, and D. K. Biswas. Dec 81, 18p

Keywords: *India, *Poultry, Production, Site surveys, Planning, Poultry equipment, Poultry houses, Dimensions, Ventilation, Sanitation, Feeders, Eggs, Marketing, Vaccines, Developing country application.

The booklet gives the guidelines on how to run a broiler farm profitably, including selecting the broiler chicks, setting up the farm, building the broiler house, ventilation, sanitation and litter managment, feeding, vaccination, and medication.

PB82-210824 PC A04/MF A01
Ministry of Agriculture and Irrigation, New Delhi (India).
Tips on Better Farming 9
Dec 81, 66p

Keywords: Farms, Farm management, Recommendations, Farm crops, *Vegetables, Fruit crops, Agricultural machinery, *Crops, *Farming, Fertilizers, Developing country application, Manure.

The booklet recommends new varities of crops, fodders, vegetables, and fruits, which have showed good yields in experiment condition, and some useful farming practices which will benefit farmers. Specific crops studied are: Arhar, bajra, barley, coconut, castor, cotton, foxtail millet, groundnut, jowar, maize, mung, paddy, pepper, ragi, sarpagandhi, soyabean, sugarcane, tapioca, turmeric, vanilla, wheat. Implements and machines; manures and fertilizers; pest, disease, and weed controlling methods; and better practices for poultry and animal husbandry are also recommended.

PB82-212473 PC A03/MF A01
Population Reference Bureau, Inc., Washington, DC.

Nuptiality Patterns in Developing Countries: Implications for Fertility
Jane S. Durch. Dec 80, 48p
Contract AID/DSPE-C-0024

Keywords: Fertility, Asia, Latin America, Demographic surveys, Age, Developing countries, *Women, *Birth control, Developing country application, Family planning, Marriage rates.

This report, based on World Fertility Survey data from 15 selected Asian and Latin American countries, examines patterns in the formation and dissolution of marital unions and the relationship of these patterns to fertility: In brief, the data indicate that: (1) In Asia age at first marriage varies widely among countries, but nearly every country considered shows evidence of a trend toward later marriage for women; (2) The Latin American countries are generally similar in the average age at which women first marry; no particular trend toward later marriage seems to exist; (3) In Latin America, informal consensual unions are widespread. Two patterns predominate--(1) numerous consensual unions among young women which are gradually outnumbered by formal marriages; and (2) a relatively steady but low level of such unions at all ages; and (4) Women with more education or with urban backgrounds tend to marry later. Changes in marriage patterns are one means of reducing fertility. Increased education and employment opportunities for women may lead to later marriage and increased numbers of women who never marry.

PB82-213117 PC A03/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Semichemical Pulping of Bagasse (Preliminary Study)
Research progress rept. no. 10
T. C. Mantri, Y. K. Sharma, and V. Raghumath. May 79, 29p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: Bagasse, *Pulp, Mechanical properties, Chemical pulps, Newsprint, *Paper industry, *Agricultural wastes, Developing country application.

Results of preliminary laboratory experiments on the semichemical pulping of bagasse as a source of newsprint furnish are given in this report, and the details of digestion and refining of bagasse for high yield pulp are described. The strength properties of bagasse semichemical pulps are satisfactory, however, this pulp has lower opacity which may be improved by addition of fillers.

PB82-213125 PC A03/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Preliminary Experiments with Improved Hypochlorite Bleaching of Bamboo Pulps
Research progress rept. no. 24
N. R. Mohan Rao, R. M. Mathur, R. Pant, and T. K. Roy. Dec 80, 32p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: *Bamboo, *Pulp, Degradation, Tear strength, *Paper industry, Fiber strength index, Developing country application.

Investigations were carried out to find out the degradation of bamboo pulp (especially tearing strength) in the Hypocholorite stage of the CEHH sequence by determining the viscosity and fiber strength index. Attempts have been made to retain the strength by replacing 20% chlorine by hypochlorite in the chlorination stage while attaining a brightness of 68% ISO with 12% chlorine in the H 1 stage. Considerable improvement in tear strength was observed using the H/C (20:80) EHH sequence over the conventional CEHH sequence in the case of bamboo (Dendrocalamus strictus) pulp of a low Kappa number. The behavior of a commercial flash-dried bamboo pulp of a high Kappa number was observed to be difficult.

PB82-213166 PC A02/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Viscosity and Fibre Strength Measurements in Relation to Bleaching
Research progress rept. no. 25
Y. V. Sood, T. K. Roy, N. R. Mohan Rao, K. S. Moorthy, and R. M. Mathur. Dec 80, 19p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: *Bamboo, *Pulp, Vicosity, Tear strength, Bleaching, Folding endurance tests, *Paper industry, Fiber strength index, Developing country application.

Studies carried out on bamboo (Dendrocalamus strictus) pulp showed that fiber strength index (FSI) is strongly related to the tearing strength and folding endurance. The correlation between intrinsic viscosity and these properties is not as significant as with FSI. While carrying out bleaching optimization, it is not sufficient to assess the pulp quality by viscosity date alone, because sometimes a decrease in viscosity may not necessarily mean a decrease in paper strength. FSI should also be determined along with viscosity as an indicative of paper strength. Measurement of FSI using the Pulmac Zero span tensile tester can provide a quick measure of pulp degradation during the bleaching operations. For better assessment of pulp quality, viscosity data should be supplemented with FSI.

PB82-213240 PC A08/MF A01
National Inst. of Family Planning, New Delhi (India).
Vasectomy Camps: A Study
Sep 73, 155p Rept no. NIFP/REPT/SER-13

Keywords: Evaluation, Interviewing, Demography, Socioeconomic status, Social psychology, Developing countries, *India, *Birth control, Vasectomy, Developing country application, Family planning, Characteristics.

This report has three parts. The first part deals with the demographic and socioeconomic characteristics of the acceptors of vasectomy and tubectomy in different camps in India. Studies included in this part have been arranged state-wide. The second part is an indepth study of the perception of how compensation for loss of wages (incentives) promotes higher acceptance and how this is generally viewed by the acceptors. This study is based on a sample of acceptors taken from Baroda district of Gujarat. The third part covers an otherwise unexplored area of psychological indepth studies of higher compensation for loss of wages among the acceptors. The study is based on indepth interviews of acceptors from Bulandshahr and Baroda district vasectomy camps.

PB82-213273 PC A04/MF A01
Hindustan Paper Corp. Ltd., New Delhi (India).
Bleaching Investigations on Bamboo (Dendrocalamus strictus) Pulps
Research progress rept. no. 21
R. Pant, N. R. Mohan Rao, R. M. Mathur, and Y. V. Sood. Oct 80, 51p
Sponsored in part by United Nations Development Programme, New Delhi (India).

Keywords: *Bamboo, Bleaching, *Pulp, Calcium hypochlorites, Chlorine oxides, Hydrogen peroxide, Viscosity, *Paper industry, Tear strength, Chlorine dioxide, Fibre strength index.

Bleaching studies were carried out on bamboo (Dendrocalamus Strictus) pulp using different bleaching chemicals, viz., calcium hypochlorite, chlorine dioxide, and hydrogen peroxide in different sequences with a view to retain the tear strength of the unbleached pulp to the maximum extent. Studies have shown that the H/C (40:60) EHH sequence improves the viscosity, fibre strength index, and the tear strength of the bleached pulp over the conventional CEHH bleached pulp. The D/C (20:80) EDH sequence retains the maximum tear strength of unbleached pulp.

PB82-213422 PC A04/MF A01
Indian Standards Institution, New Delhi.
Handloom Industry-Quality Control and Standardization-Papers for Technical Session S-5, Nineteenth Indian Standards Convention, Madras, 17-22 January 1982
Jan 82, 70p

Keywords: *Textile industry, Looms, Meetings, Quality control, Standards, Industries, *Handicrafts, Handlooms, *India, Foreign technology, Handloom industry.

The papers presented at the convention include: Problems of Quality Control and Standardization in Handloom Industry; Handloom Fabrics - Technical Requirements for Export; Handloom Industry - Problems and Prospects; Handloom Industry in Haryana - Facilities Provided; Handloom Industry - Role of ISI; Need for ISI Standards in Handloom; Production of Polyester Blended Fabrics in the Handloom Industry; Quality Control and Standardization in Handloom Industry; Quality Assurance through Inspection of Handloom Textiles; Handloom Industry - Development to Improve Quality and Production; Quality Control of Handloom Industry - A Vendor's View; Role and Standardization of Scourable Textile Lubricants; and Traditional Handloom Saris of West Bengal - Standardization and Quality Control.

PB82-213976 PC A04/MF A01
Directorate of Building Research, Bandung (Indonesia).
Masalah Bangunan, Volume 23, Numera 3-4, September-December 1978
Djauhari Sumintardja, Soearli Salam, and Sakti Prajitno. Dec 78, 56p
Also pub. as ISSN-0025-4436.

Keywords: *Soil erosion, *Indonesia, *Forestry, *Southeast Asia, Harvesting, Education, Income, Construction, Industries, Developing country application.

The document contains articles selected from the seminars and meetings held in 1978 in the Southeast Asian region. The topics touched in this document are the protective approach to soil erosion in Indonesia, the benefits and disadvantages of exploitation of forestry in East Kalimantan to obtain foreign exchange, establishing schools in densely populated urban areas in Singapore, improving low income residential areas in South East Asian cities, the construction industry in Indonesia and traditional housing in Indonesia. ASEAN experts meeting on the environment and a meeting on educational facilities program development are also reported along with their recommendations.

PB82-214818 PC A03/MF A01
Indian Chemical Manufacturers Association, Bombay.
Proceedings of the Workshop on Feedstocks for Organic Chemical Industries, Bombay, July 18, 1981
Jul 81, 50p

Keywords: *Chemical industry, Organic compounds, Meetings, Ethyl alcohol, Fuels, Foreign technology, Chemical feedstocks.

Various aspects of feedstocks for organic chemical industries were discussed at this workshop. Consideration was given to both renewable as well as non-renewable feedstocks. Recommendations made by the participants to improve the quality and availability of feedstocks are also presented. Some specific case studies have been cited.

PB82-214842 PC A05/MF A01
Indian Lead Zinc Information Centre, New Delhi.
Lead Scrap and Its Utilization: A Comprehensive Report Including Bibliography on Secondary Lead
Oct 72, 76p

Keywords: Metal scrap, *Lead(Metal), Utilization, Reclamation, Materials recovery, Industries, *Waste recycling, Metal recycling, Developing country application.

With rapid advancement in refining and analytical techniques, it is now possible to obtain secondary metals of high purities, at much lower costs than virgin metals. An interesting feature about lead is that almost 80% of the metal that is used for various applications becomes available after a period of time for reuse and recycling. This report deals with various aspects of lead scrap and its utilization: Sources of secondary lead; Classification of Lead Scrap; Collection of Lead Scrap and Residues; Reclamation of Metallic Values of Lead Scrap and Residues. The secondary lead industry in India is also described and some recommendations and suggestions for improving the utilization of lead scrap are given. A bibliography is also annexed.

PB82-214925 PC A07/MF A01
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Instructor's Manual
C. R. Cronk, Anthony Gryzmala, and Gretchen Manley. 1978, 149p

Keywords: Specialized training, Developing countries, Instructors, Instructional materials, Hygiene, Nutrition, Sanitation, *Health, *Health manpower, *Training, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The instructor's manual provides guidance in training techniques, including enhancement of trainee participation. The manuals are published in English, Spanish, and French. This manual is in English. It is available in French as PB82 214 941 and in Spanish as PB82 214 933. The Trainee's Manual is available in English as PB82 214 966, in French as PB82 214 958, and in Spanish as PB82 214 974.

PB82-214933 PC A08/MF A01
Project Concern International, San Diego, CA.
Manual de Entrenamiento para el Promotor de Salubridad de la Aldea: Manual del Instructor. (Health Care Training Manual for the Village Health Promoter: Instructor's Manual).
C. F. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 153p
Text in Spanish.

Keywords: Specialized training, Developing countries, Instructors, Instructional materials, Hygiene, Nutrition, Sanitation, *Health manpower, *Training, *Health, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training materials and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The instructor's manual provides guidance in training techniques, including enhancement of trainee participation. The manuals are published in English, Spanish, and French. This manual is in Spanish. It is available in English as PB82 214 925 and in Spanish as PB82 214 941. The Trainee's Manual is available in Spanish as PB82 214 974, in English as PB82 214 966, and in French as PB82 214 958.

PB82-214941 PC A09/MF A01
Project Concern International, San Diego, CA.
Manual de Soins Sanitaires a l'Usage de l'Agent de Sante: Guide du Professeur. (Health Care Training Manual for the Village Health Promoter: Instructor's Manual).
C. R. Cronk, Anthony Gryzmala, and Gretchen Manley. c1978, 184p
Text in French.

Keywords: Specialized training, Developing countries, Instructors, Instructional materials, Hygiene, Nutrition, Sanitation, *Health, *Health manpower, *Training, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training materials and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The instructor's manual provides guidance in training techniques, including enhancement of trainee participation. The manuals are published in English, Spanish, and French. This volume is in French. It is available in English as PB82 214 925 and in Spanish as PB82 214 933. The Trainees's Manual is available in French as PB82 214 958, in English as PB82 214 966, and in Spanish as PB82 214 974.

PB82-214958 PC A14/MF A01
Project Concern International, San Diego, CA.
Manuel de Soins Sanitaires a l'Usage de l'Agent de Sante: Guide du Stagiaire. (Health Care Training Manual for the Village Health Promoter: Trainee's Manual).
C. R. Cronk, Gretchen Manley, and Anthony Gryzmala. c1978, 320p
Text in French.

Keywords: Specialized training, *Health, Developing countries, Students, Instructional materials, Hygiene, Nutrition, Sanitation, *Health manpower, *Training, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in the trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This volume is in French. The English version is available as PB82 214 966 and the Spanish version is available as PB82 214 974. The Instructor's Manual is available in French as PB82 214 941, in English as PB82 214 925, and in Spanish as PB82 214 933.

PB82-214966 PC A13/MF A01
Project Concern International, San Diego, CA.
Health Care Training Manual for the Village Health Promoter: Trainee's Manual
C. R. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 290p

Keywords: Specialized training, Developing countries, Students, Instructional materials, Hygiene, Nutrition, Sanitation, *Training, *Health, *Health manpower, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in this trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This manual is in English. It is available in French as PB82 214 958 and in Spanish as PB82 214 974. The Instructor's Manual is available in English as PB82 214 925, in French as PB82 214 941, and in Spanish as PB82 214 933.

PB82-214974 PC A13/MF A01
Project Concern International, San Diego, CA.
Manual de Entrenamiento para el Promotor de Salubridad de la Aldea: Manual del Estudiante. (Health Care Training Manual for the Village Health Promoter: Trainee's Manual).
R. C. Cronk, Gretchen Manley, and Anthony Gryzmala. 1978, 290p
Text in Spanish.

Keywords: Specialized training, Developing countries, Students, Instructional materials, Hygiene, Nutrition, Sanitation, *Training, *Health, *Health manpower, *Health education, Developing country application.

The Village Health Promoter Trainee's and Instructor's Manuals are designed to aid in the training of community level primary health care workers, utilizing both formal and nonformal training techniques. The training material and its presentation are intended for use in the training of selected trainees who have achieved basic literacy. The material contained in the trainee's manual of 37 chapters, and 335 pages in the English version, is broad in scope, extending from training in basic curative care in a wide range of common illnesses, to considerable emphasis on preventive health care in such areas as maternal and child health, nutrition education, environmental sanitation and hygiene, family planning, and health education in general. The manuals are published in English, Spanish, and French. This book is in Spanish. It is available in English as PB82 214 966 and in French as PB82 214 958. The Instructor's Manual is available in Spanish as PB82 214 933, in English as PB82 214 925, and in French as PB82 214 941.

PB82-215674 PC A05/MF A01
Costa Rica Univ., San Jose. Inst. de Investigaciones en Ciencias Economicas.
Los Empresarios y la Politica Industrial en Costa Rica. (Entrepeneurs and the Industrial Policy in Costa Rica).
Amparo Pacheco. Feb 81, 87p Rept no. 21
Text in Spanish.

Keywords: Industries, *Costa Rica, Businesses, Government, Policies, *Industrial development, Developing country application.

The report presents a new aspect of the industry: i.e.: the entrepeneurs' opinion of the role of the government in the Manufacturing Industry. The results are taken from a survey made in 1978. The information has taken in consideration the size of the industries, in order to determine the differences and similarities among them, for the evaluation of the government help they may obtain. The report is in Spanish. Charts and a questionnaire are included.

PB82-216417 PC A04/MF A01
Indian Association of Geohydrologists, Calcutta.
Seminar on Development and Management of Ground Water Resources: Abstracts of Papers
Vigyan Bhawan. 1981, 59p

Keywords: *Ground water, *Water resources, Meetings, *India, Hydrogeology, *Hydrology, Remote sensing, Alluvium, Management, Nitrogen, Coasts, Water quality, Developing country application.

This document contains abstracts of 50 papers presented to a seminar of the Indian Association of Geohydrologists, the papers cover most aspects of hydrology and are not in any particular order.

PB82-216516 PC A05/MF A01
Shri Ram Inst. for Industrial Research, New Delhi (India).
Value of Scientific Research
T. R. Seshadri. Apr 69, 98p

Keywords: Research management, *India, Development, Resources, Requirements, Industries, *Research and development, Foreign technology.

The selected memorial lectures presented in this book together comprise a comprehensive study of the importance of scientific research in development. The lectures outline problems of government involvement with research, and recommend as much private research as can be induced. The lecture topics are: Value of Scientific Research; Science and India's future; Science and Technology in Relation to Indian needs and Resources; Research and Indian Industry; Developing Patterns of Industrial R&D Culture; Converting a Scientific Breakthrough in Agriculture into a production Advance.

PB82-216532 PC A02/MF A01
Indian Paint Association, Calcutta.
Role of Paint in Protection Against Corrosion
1977, 21p

Keywords: Protective coatings, *Corrosion, *Paints, Developing country application.

Corrosion of metals, specially of steel, is a gigantic problem. The losses due to corrosion can be reduced dramatically. This brochure explains the role paints can play in combating this problem. The report provides a chart giving the characteristics of different types of paint and explains the proper method of cleaning the surface and applying the paint to stop and prevent corrosion.

PB82-217068 PC A11/MF A01
Indian Council of Agricultural Research, New Delhi.
Wheat Research in India 1966-1976
P. L. Jaiswal, S. N. Tata, and R. S. Gupta. Feb 78, 250p

Keywords: *India, *Wheat, Area, Genetics, Hybridization, Quality, Plant diseases, Marketing, Food storage, Seeds, Nematodes, Plant physiology, Pest control, Developing country application, Dwarf wheat plants.

The various aspects of the scientific work done in India in recent years in wheat are summarized in this report. The chapters covered are: Wheat in India; Wheat Zone in India; Varietal Improvements; Cytogenetics; New Agronomic Practices; Physiology; Diseases; Insect Pests; Nematode Problems; Wheat Quality; Transfer of Research Results to the Cultivator; Production and Marketed Surplus of Wheat; Marketing and Storage; Seed Production; and Triticale Improvement.

PB82-217076 PC **A04/MF A01**
Indian Agricultural Research Inst., New Delhi.
Bacterial Fertilizers
W. V. B. Sundra Rao. Oct 81, 59p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: *Fertilizers, Bacteria, Microorganisms, Nitrogen, Azobacter, Cyanophyta, Preparation, Algae, *India, Phosphobacteria, Developing country application.

The term bacterial (microbial) fertilizers refers to preparations containing primarily active strains of the microorganisms mainly bacteria in sufficient numbers. This report covers various aspects of bacterial fertilizers. Nitrogen Preparation and Usage; Azotobacterin; Blue-Green Algae; and Phosphobacterin.

PB82-218819 PC **A03/MF A01**
Tribhuvan Univ., Kathmandu (Nepal). Research Centre for Applied Science and Technology.
The New Nepali Chulo: Fuel Efficient and Smokeless Cooking Stoves
Jul 80, 39p

Keywords: *Stoves, Manuals, Design, Construction, *Wood stoves, *Energy conservation, *Nepal, Wood burning appliances, Developing country application.

This report explains with diagrams how to build a new fuel efficient and smokeless woodburning stove, using designs chosen from several tested. The stoves can be built with local materials, using and developing skills from the area where they are to be used. These stoves result in a smokeless kitchen, improving the health conditions, and the fuel consumption is reduced by as much as 50%, depending on such things as the proper handling of dampers. Although the book does not claim to be a do-it-yourself manual, a person with basic masonry skills should be able to fashion several different kinds of these stoves from the information provided.

PB82-218827 PC **A17/MF A01**
National Buildings Organisation, New Delhi (India).
Selected Papers from Training Course on Sociological and Economic Aspects of Housing
Proceedings of symposia and seminars no. 13.
1972, 382p

Keywords: *Housing, Economic factors, Sociology, Rural areas, Urban areas, Planning, Communities, Construction, Manpower, Financing, Policies, Developing countries, Specialized training, Instructional materials, India, Foreign technology, Developing country application, Curricula, Villages.

The National Buildings Organization organizes training courses on the 'Sociological and Economic Problems in the Field of Housing' for the benefit of 'in-service' officials connected with the various disciplines of housing and building. The objective of these courses is to acquaint men in the field with the problems encountered and to suggest methods of tackling them suitably. Lectures on subjects concerning sociological and economic aspects of housing are delivered by specialists in the field. This publication is a compilation of selected lectures from the first three training courses held by the National Buildings Organization. It contains 64 lectures presented under 8 chapters. The chapters are: Evolution of Housing (3 lectures); Urban and rural sociology (8 lectures); demographic aspects in relation to housing (7 lectures); housing statistics (9 lectures); housing economics and finance (19 lectures); community planning (4 lectures); productivity labor, manpower and materials planning in building sector (5 lectures); housing policy, schemes, programs and administration (9 lectures).

PB82-218959 PC **A09/MF A01**
Punjab Agricultural Univ., Ludhiana (India). Dept. of Plant Breeding.
Research on Dwarf Wheats
Khem Singh Gill. Aug 79, 194p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: *India, *Wheat, Plant genetics, Plant physiology, Plant diseases, Breeding, Pest control, Agronomy, Dwarf wheat plants.

The work on the breeding, genetics, diseases, insect pests, agronomy, physiology and grain quality done so far in various research institutes in India have been reviewed.

PB82-218967 PC **A02/MF A01**
Ministry of Agriculture and Irrigation, New Delhi (India).
Diagnosis of Tuberculosis in Animal with Special Reference to the Tuberculin Test
J. M. Lall. 1978, 24p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: Tuberculosis, Diagnosis, Immunization, Animals, Antigen antibody reactions, Bacterial diseases, *Animal diseases, Infectious diseases, Tuberculin test, Developing country application.

The report covers: Tuberculin Test; Mechanism of Tuberculin Reaction; Infection-Producing Non-Specific Sensitizations; Other Causes of Non-Specific Sensitizations; Choice of Tuberculin; Tuberculin Tests and their Comparative Value; and Tuberculin Tests in Fowls. A bibliography on the subject is appended.

PB82-218975 PC **A05/MF A01**
Indian Veterinary Research Inst., Izatnagar.
Diagnosis and Treatment of Helminthic Infections
Suresh Singh, and H. D. Srivastava. Sep 77, 100p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: Helminthic diseases, Infectious diseases, Parasitic diseases, Diagnosis, Parasites, Drugs, *Diseases, *India, Host parasite relations, Developing country application.

There is presently little information on methods of diagnosing helminthic infections. This book deals, in detail, with the routine methods of diagnosis. A list of common parasites, arranged host-wise in a tabular form, and the drugs commonly used have been given. The formulae of the various stains, fixatives, reagents etc. have also been incorporated. A host-parasite list and important references have been appended.

PB82-218983 PC **A05/MF A01**
Punjab Agricultural Univ., Ludhiana (India).
Farm Management
A. S. Kahlon, and Karam Singh. 1978, 98p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: *India, Farm management, Economic factors, Decision making, Farms, Cost analysis, Production, Marketing, Optimization, *Agriculture, *Management techniques, Developing country application.

The emphasis in farm management mainly remains on technical aspects of a particular technology or a method of production or a farm practice without realizing the resource constraints, managerial competence and the skills required for the adoption of a new technology. In this report, an attempt is made to fill this gap and clarify several methodological issues which have affected the quality of the farm management work in the country.

PB82-219304 PC **A10/MF A01**
Central Potato Research Inst., Simla (India).
Bacterial and Fungal Diseases of Potato
B. L. Dutt. Jun 79, 204p
Sponsored in part by Indian Council of Agricultural Research, New Delhi.

Keywords: *Plant diseases, *Potatoes, Vegetables, Fungi, Bacteria, India, Signs and symptoms, Diseases, Plant pathology, Fungus diseases, Developing country application, Pathogens.

This report is a special treatise on potato diseases caused by fungi and bacteria in India. The author has discussed in detail the distribution of the diseases, their symptoms, sources of infection, factors affecting the diseases, host range of the pathogen and methods of control. This report is mainly intended for use by technical field workers and farmers to identify a disease in the field and to take proper control measures. It should also be of interest to researchers, students and teachers of plant pathology. Bacterial diseases covered are brown rot or bacterial wilt, blackleg or soft rot, and common scab. Fungal diseases covered are wart disease, powdery scab, late blight, powdery mildew, black scurf and stem canker, sclerotium rot, black dot, verticilium wilt, early blight, silver scurf, leaf blotch, cercospora leaf spot and stem canker, dry rot, fusarium wilt, charcoal rot, ozonium rot. An appendix lists symptoms for easy identification of potato diseases.

PB82-220476 PC **A09/MF A01**
Conifers Research Center, Simla (India).
Silviculture, Management and Utilization of Poplars: Proceedings of a Symposium Held at Srinagar on October 15-18, 1979
R. V. Singh. Oct 79, 196p

Keywords: Poplar wood, *India, *Forestry, Meetings, Planting, Germination, Pest control, Plant diseases, *Wood, Wood pulp, Feeding stuffs, Utilization, Developing country application, Poplar trees.

Poplars, which are fast growing and produce multipurpose wood, can help the problem of depleting forest resources. This report contains papers presented at a symposium. A total of 45 papers cover: Silviculture of Poplars; Management of Poplars; and Utilization of Poplars. Specific subjects covered are planting, germination, and rooting branch cuttings under silviculture of poplars; growth rate, seasonal variation of wood, insect pests, and diseases under Management of poplars; and wood boxes, artificial limbs, pulp and paper, animal feed, and match industry under utilization of poplars.

PB82-226093 PC **A15/MF A01**
Council of Scientific and Industrial Research, New Delhi (India).
Glossary of Indian Medicinal Plants
R. N. Chopra, S. L. Nayar, and I. C. Chopra. c1956, 350p

Keywords: *India, *Medicinal plants, Dictionaries, Drugs, Chemical compounds, Vitamins, Yeast, Lactic acid, Oxalic acid, Heart diseases, Developing country application, Peppermint, Pinus, Cannabis, Kalanchoe, Kaempferia, Juniperus, Digitalis.

This volume provides the medicinal properties of about 3,000 plants. The plants have been arranged in alphabetical order according to their scientific names so readers can find any particular drug on which information is required. Many of the commonly used synonyms and Indian vernacular names have been inserted and cross references to their modern scientific names are given. The conditions of disease for which the particular plant is used are also briefly listed and brief descriptions of the active principles of plants are included.

PB82-226101 PC **A07/MF A01**
Council of Scientific and Industrial Research, New Delhi (India).
Supplement to Glossary of Indian Medicinal Plants
R. N. Chopra, I. C. Chopra, and B. S. Varma. c1969, 133p

Keywords: *India, *Medicinal plants, Dictionaries, Drugs, Chemical compounds, Vitamins, Flavor, Tannins, Fatty acids, Leaves(Botany), Diabetes, Acetal..., Hypoglycemia, Lactones, Terpene compounds, Developing country application, Citrus trees, Hemerocallis, Coccinia.

This supplement provides the medicinal properties of some 1,000 plants. The plants have been arranged in alphabetical order according to their scientific names so readers can find any particular drug on which information is required. Many of the commonly used synonyms and Indian vernacular names have been inserted, and cross references to their modern scientific names are given. The conditions of disease for which the particular plant is used are also briefly listed, and

brief descriptions of the active principals of plants are included.

PB82-226747 PC E06/MF E06
Appropriate Health Resources and Technologies Action Group, London (England).
Dispensarios de Primeros Servicios de Salud: Bibliografia Anotada (Auxiliaries in Primary Health Care: Annotated Bibliography)
Katherine Elliott. c1979, 125p Rept no. ISBN-0-903031-58-2
Text in Spanish.

Keywords: Bibliographies, Public health, Personnel, Indexes(Documentation), Communities, Abstracts, Foreign countries, Primary health care, Developing country application, Allied health personnel, *Health manpower, *Health education, Subject indexes, Community health services.

The bibliography is a reference for those concerned with the training and supervision of health auxiliaries. It is intended to promote a greater exchange of know-how, of useful teaching materials, and background information, and to encourage experimentation. Section I deals with education and training of auxiliaries in primary health care. Section II covers auxiliaries and community health and development. Appendices include a geographical index, addressos, journals referred to in the bibliography, and publishers referred to in the bibliography.

PNL-2521 PC A06/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Siting Handbook for Small Wind Energy Conversion Systems
H. L. Wegley, M. M. Orgill, and R. L. Drake. May 78, 118p
Contract EY-76-C-06-1830

Keywords: *Turbines, *Wind energy, USA, Wind power, Wind turbines, Availability, Site selection, Topography.

The primary purpose of this handbook is to provide siting guidelines for laymen who are considering the use of small wind energy conversion systems. With this purpose in mind, the handbook is being published in its current form to provide basic strategies to users as early as possible. The handbook will soon require updating due to rapidly changing technology and the evolving needs of users. Consequently, the authors also intend for this edition to serve as a review copy prior to wider distribution. (ERA citation 03:052367)

RFP-2841/1270/78/4 PC A11/MF A01
Nielsen Engineering and Research, Inc., Mountain View, CA.
Wind Power for Farms, Homes, and Small Industry
J. Park, and D. Schwind. Sep 78, 229p
Contract EY-76-C-03-1270, EY-76-C-04-3533

Keywords: *Wind energy, *Turbines, Wind power, Wind turbines, Availability, Economics, Feasibility studies, Legal aspects, Site selection, Specifications.

Information is presented concerning basic wind turbine energy conversion; wind behavior and site selection; power and energy requirements; the components of a wind energy conversion system; selecting a wind energy conversion system and system economics; and legal aspects. (ERA citation 04:018648)

RHO-CD-829 PC A07/MF A01
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Wood Pellet Feasibility Study
C. H. Dohrer. 31 Oct 79, 133p
Contract EY-77-C-06-1030

Keywords: Boiler fuel, Fuel substitution, *Wood wastes, Air quality, Cost benefit analysis, Economics, Efficiency, Feasibility studies, Fire hazards, Fuel pellets, Materials handling, Pelletizing, Standards, Steam, *Wood, *Fuels, Synthetic fuels, Solid wastes.

This study effort was undertaken to determine the feasibility of using pelletized wood as an alternative fuel supply while retaining the capabilities of returning to the use of coal without interrupting steam production. Pelletized wood fuel was fired in two of four boilers rated at 80,000 pounds of steam per hour each. No modifications to the existing systems were required in order to conduct the study. Wood pellets can be fired efficiently at up to 85 percent of boiler capacity without exceeding particulate emission or opacity standards which eliminates the need for gas control exhaust measures. The lower ash volume of wood pellets can produce a 75 percent savings in ash handling and disposal costs. The need for additional receiving, storage and conveyance facilities for dust control and reduction of the fire and explosion hazards presented by wood pellets cannot be justified by savings in fuel or operating costs. The estimated yearly delivered cost of wood pellets to Hanford exceeds the known yearly delivered cost of the equivalent Btu value of coal. The increase operating costs incurred by firing wood pellets are not offset by savings in ash handling and baghouse operating costs. Based on the capital cost of additional facilities for wood pellets and increased operating cost while using this fuel in lieu of coal, the use of wood pellets as an alternative to coal in the 200 West Area powerhouse is not economically feasible at this time. Wood pellet and coal prices should, however, remain under observation and the option of firing wood pellets be reviewed if a change in cost dictates an economic advantage. It is recommended that steam plants faced with expensive emission improvements or high fuel costs seriously consider the use of wood pellets as a substitute fuel. (ERA citation 05:013227)

SAN/1122-76/1 PC A13/MF A01
Altas Corp., Santa Clara, CA.
Description of the Solar Energy R and D Programs in Many Nations. Final Report
F. de Winter, and J. W. de Winter. Feb 76, 298p
Contract E(04-3)-1122

Keywords: *Solar energy, Research programs, Foreign countries.

The present report includes descriptions of the Solar Energy R and D Programs of 32 countries, of the Organization of American States, of UNESCO, and of a number of private organizations. The descriptions were solicited from the most reliable representatives known for the individual countries, and were received between late July 1975 and February 1976. (ERA citation 01:025543)

SAN/1220-1 PC A12/MF A01
General Electric Co., Philadelphia, PA. Space Div.
Application of Solar Energy to the Supply of Hot Water for Textile Dyeing. Final Report, CDRL/PA 10
Sep 77, 265p
Contract EY-76-C-03-1220

Keywords: Solar process heat, Solar water heaters, *Textile industry, Data acquisition, Design, Diagrams, Dyes, Economics, Energy consumption, Feasibility studies, Industrial plants, Medium vacuum, Performance, Planning, Sensible heat storage, Solar collectors, Specifications, Tanks, Textiles, Water, *Process heat, *Solar water heating, Hot water heating, Industries.

The design plan for a solar process hot water system for a textile dye beck at Riegel Textile Corporation's LaFrance, South Carolina, facilities is presented. The solar system consists of 396 GE model TC 100 evacuated tube collector modules arranged in a ground mounted array with a total collector area of 6680 square feet. The system includes an 8000-gallon hot water storage tank. Systems analyses, specification sheets, performance data, and an economic evaluation of the proposed system are presented. (ERA citation 03:021360)

SAN-1609-T1 PC A99/MF A01
Plastics Inst. of America, Inc., Hoboken, NJ.
Maximizing the Life Cycle of Plastics. Final Report
W. L. Hawkins. Feb 80, 800p
Contract EC-77-S-03-1609

Keywords: Plastics, Plastics industry, Combustion, Coordinated research programs, Energy conservation, Materials recovery, Recycling, *Waste recycling.

The Plastics Research Institute has conducted a coordinated research program designed to extend the useful life of plastics. Since feedstock for practically all synthetic plastics is derived from fossil fuel, every effort should be made to obtain the maximum useful life from these materials. Eventually, plastic scrap may be used as a fuel supplement, but this disposal route should be followed only after the scrap is no longer reusable in its polymeric form. The extent to which plastic scrap will be recovered and reused will be affected by the economic situation as well as the available supply of fossil fuel. The Institute's program was conducted at five major universities. Dedicated faculty members were assembled into a research team and met frequently with members of the Institute's Board of Trustees to review progress of the program. The research was conducted by graduate students in partial fulfillment of degree requirements. Summaries are presented of the following research projects: Improved Stabilization; Separation of Mixed Plastic Scrap; Compatibilizing Agents for Mixed Plastic Scrap; Controlled Degradation of Plastic Scrap; and Determination of Compatibility. (ERA citation 05:027370)

SAND-75-0530 PC A03/MF A01
Sandia Labs., Albuquerque, NM.
Engineering of Wind Energy Systems.
J. F. Banas, and W. N. Sullivan. Jan 76, 27p
Contract AT(29-1)-789

Keywords: *Turbines, *Wind energy, Wind turbines, Performance, Comparative evaluations, Configuration, Efficiency, Electric power, Power generation, Wind power generation.

The engineering of wind energy systems is analyzed from the point of view of component selection and performance assessment. Combinations of two load types (variable and constant speed) and three turbine types connected by a fixed-gear-ratio transmission constitute the various systems investigated. The three turbine types result from introducing the notions of nested, unnested, and hybrid power coefficients suggested by current performance characteristics of American Multiblade, Darrieus, and Darrieus/Savonius turbines. The engineering problems associated with these systems are discussed qualitatively, emphasizing the nature, magnitude, and variability of the problems. 11 references.

SAND-78-2419C PC A02/MF A01
Sandia Labs., Albuquerque, NM.
Overview of Solar System Design and Application Principles
V. L. Dugan. 1979, 11p Rept no. CONF-790203-1
Contract EY-76-C-04-0789
Solar energy symposium, Tokyo, Japan, 5 Feb 1979,

Keywords: *Solar collectors, Comparative evaluations, Concentrating collectors, Design, Efficiency, *Solar water pumps, Performance, Reviews, Technology assessment, Uses.

Solar thermal energy conversion systems represent a method of reducing dependency on stored energy reserves; this is done at the expense of an increased dependency on materials and land resources. The various technologies being investigated to convert solar radiation into thermal energy are reviewed, and general guidelines which should be followed in designing and applying cost-effective solar conversion systems are presented. This information is expanded upon and illustrated by a comparison of performance results for a range of solar thermal technologies and by one solar irrigation application in the United States. (ERA citation 04:029704)

SERI/CP-622-1086 PC A11/MF A01
Solar Energy Research Inst., Golden, CO.
Tree Crops for Energy CO-Production on Farms
1980, 241p Rept no. CONF-801172-
Contract AC02-77CH00178
Tree crops for energy co-production on farms, Estes Park, CO, USA, 12 Nov 1980.

Keywords: Biomass plantations, Fruits, Seeds, Trees, *Alcohols, *Animal feeds, Crops, *Energy source development, Energy sources, Fermentation, Food, Fuels, Meetings, Production, Uses.

This volume contains papers presented at a workshop exploring implications of tree crops for energy production on farms. A summary of the last day's discussion concerning future research, development and demonstration recommendations is included. The appendix contains a computer-search bibliography on tree-crops. Separate abstracts have been prepared for indi-

vidual papers for inclusion in the Energy Data Base. (ERA citation 06:016658)

SERI/CP-635-938 PC A10/MF A01
Solar Energy Research Inst., Golden, CO.
SERI Second Wind Energy Innovative Systems Conference
1980, 225p Rept no. CONF-801223-
Contract AC02-77CH00178
Wind energy innovative systems conference, Colorado Springs, CO, USA, 3 Dec 1980.

Keywords: Wind turbines, Leading abstract, Meetings, Performance testing, Specifications, *Wind energy, *Turbines.

Separate abstracts are included for each of the papers included concerning wind turbine designs and performance characteristics. (ERA citation 06:006008)

SERI/SP-451-519 PC$5.75/MF A01
Solar Energy Research Inst., Golden, CO.
Fuel from Farms - A Guide to Small Scale Ethanol Production
Feb 80, 163p*
Contract DOE-EG-77-C-01-4042

Keywords: *Ethanol, Farms, *Agricultural wastes, Fermentation, Gasohol program, Economic analysis, Crops, Biomass plantations, Technology utilization, Design, Equipment, Management, Capital, Operating costs, State government, National government, Regulations, Environmental surveys, *Bioconversion, Synthetic fuels, Solid wastes, Process charting, Management planning, Capitalized costs, Manufacturing gas.

The expanding support for gasohol in this country over the last several years provides an opportunity to directly reduce U.S. oil imports in the very near future. Interest is evident by the many requests for information about gasohol that are being received throughout the federal government daily. This guide has been prepared to meet the challenge of filling the information void on fermentation ethanol in a balanced, reasoned way, with emphasis on small-scale production of fermentation ethanol using farm crops as the source of raw materials. The report covers the following aspects: Decision to produce--(Benefits, markets and uses, market assessment, production potential, equipment selection, financial requirements, and decision and planning worksheets); Basic ethanol production--(Preparation of feedstocks, fermentation, and distillation); Feedstocks--(Types of feedstocks, coproduct yields, agronomic considerations, and feedstock considerations); Plant design--(Overall plant considerations, individual system considerations, process control, representative ethanol plant, and maintenance checklist); Business plan--(Analysis of financial requirements, organizational form, financing, and case study). The appendices include these topics: Summary of legislation, Bureau of Alcohol, Tobacco, and Firearms permit information; Environmental considerations; Reference information; Resource people and organizations.

SERI/TP-333-429 PC A23/MF A01
Solar Energy Research Inst., Golden, CO.
Solar Industrial Process Heat Conference Proceedings
1979, 533p Rept no. CONF-791024-
Contract EG-77-C-01-4042
Solar industrial process heat conference, San Francisco, CA, USA, 31 Oct 1979.

Keywords: Industry, *Process heat, California, Leading abstract, Meetings, Proceedings, *Solar energy.

Separate abstracts were prepared for 41 of the 54 papers presented. The remaining thirteen papers were previously included in the data base. (ERA citation 05:023905)

SERI/TP-51-256 PC A02/MF A01
Solar Energy Research Inst., Golden, CO.
International Development Assistance for Renewable Technologies: Current Programs and Institutional Requirements
J. H. Ashworth, and R. E. Meunier. May 79, 7p Rept no. CONF-790541-15
Contract EG-77-C-01-4042
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Keywords: Developing countries, Renewable energy sources, Economics, Financing, Institutional factors, *Energy, Investment, Solar Energy Research Institute.

Within the last several years, foreign-assistance donor agencies have begun to provide significant aid for the search for renewable energy sources for developing nations. This paper reports preliminary results from a survey of development--assistance projects in renewable energy sources, indicating which areas are extensions of traditional assistance areas and which are new areas of involvement. The last two portions of the paper indicate certain shortcomings in the current effort, and linkages that must be emphasized in order to incease the effectiveness of the range of donor activities. (ERA citation 04:046833)

SERI/TP-722-1162 PC A02/MF A01
Solar Energy Research Inst., Golden, CO.
Educating the Design Professional: Energy-Conscious Design for Commercial Buildings
N. Carlisle, and G. Franta. Apr 81, 5 Rept no. CONF-810509-15
Contract AC02-77CH00178
Annual conference of the International Solar Energy Society, Philadelphia, PA, USA, 26 May 1981.

Keywords: Commercial buildings, Solar architecture, Architects, Design, Education, Engineers, Meetings, Solar process heat, *Solar energy, *Buildings.

The energy problem in a residence is substantially different from that in a commercial building; therefore, the approach to using renewable resources in a commercial building differs from that in a residence. For this reason, educational materials, seminars, and workshops developed to teach architects and engineers basic design principles to integrate renewable energy into commercial buildings must differ from that developed for residential building designers. The purpose of this paper is to identify some of the differences in approach between residential and commercial solar design, discuss what the Solar Energy Research Institute (SERI) Commercial Buildings Group has learned about educating commercial building design professionals through experience, and describe the American Institute of Architects (AIA) national effort to educate architects about energy-conscious design. (ERA citation 06:018370)

SERI/TP-733-617 PC A02/MF A01
Solar Energy Research Inst., Golden, CO.
Solar Ponds and Their Applications
T. S. Jayadev, and M. Edesess. Mar 80, 12p Rept no. CONF-800352-4
Contract AC02-77CH00178
Energy technology conference and exposition, Washington, DC, USA, 24 Mar 1980.

Keywords: *Solar ponds, Cost, Efficiency, Heat storage, Payback period, Resource potential, Reviews, *Process heat, *District heating, Solar district heating, Uses.

Solar ponds are probably the simplest and least expensive technology for conversion of solar energy to thermal energy. The solar pond is unique in its ability to act both as collector and as storage. The cost of a solar pond per unit area is considerably less than that of any active collector available today. The combination of their economic and technical factors make solar ponds attractive for district heating and industrial process heat applications. Solar ponds have the potential to displace significant quantities of fossil fuel in low-temperature heating applications in nonurban areas. (ERA citation 05:028814)

SERI/TP-744-661 PC A06/MF A01
Solar Energy Research Inst., Golden, CO.
Developing Common Information Elements for Renewable Energy Systems: Summary and Proceedings of the SERI/AID Workshop
J. H. Ashworth, and J. W. Neuendorffer. Jun 80, 125p Rept no. CONF-800250-
Contract AC02-77CH00178
Workshop on evaluated systems for renewable energy systems, Golden, CO, USA, 20 Feb 1980.

Keywords: Developing countries, Renewable energy sources, Appropriate technology, Colorado, Decision making, *Information sources, Information, Information needs, Meetings, Program management, Recommendations, Surveys, Total energy systems, *Energy.

This report describes the activities, conclusions, and recommendations of the Workshop on Evaluation Systems for Renewable Energy Systems sponsored by the Agency for International Development and SERI, held 20-22 February 1980 in Golden, Colorado. The primary objectives of the workshop was to explore whether it was possible to establish common information elements that would describe the operation and impact of renewable energy projects in developing countries. The workshop provided a forum for development program managers to discuss the information they would like to receive about renewable energy projects and to determine whether common data could be agreed on to facilitate information exchange among development organizations. Such information could be shared among institutions and used to make informed judgments on the economic, technical, and social feasibility of the technologies. Because developing countries and foreign assistance agencies will be financing an increasing number of renewable energy projects, these organizations need information on the field experience of renewable energy technologies. The report describes the substance of the workshop discussions and includes the papers presented on information systems and technology evaluation and provides lists of important information elements generated by both the plenary sessions and the small working groups. (ERA citation 05:033744)

SERI/TR-33-239(V.1) PC A03/MF A01
Solar Energy Research Inst., Golden, CO.
Survey of Biomass Gasification. Volume I. Synopsis and Executive Summary
Jul 79, 45p
Contract EG-77-C-01-4042

Keywords: Biomass, Gasification, Synthetic fuels industry, Ammonia, Anaerobic digestion, *Bioconversion, *Agricultural wastes, *Fuels, Commercialization, Economics, Gasoline, Methane, Methanol, Pyrolysis, Recommendations, Reviews, Synthesis, Waste processing, Solid wastes.

Biomass can be converted by gasification into a clean-burning gaseous fuel that can be used to retrofit existing gas/oil boilers, to power engines, to generate electricity, and as a base for synthesis of methanol, gasoline, ammonia, or methane. This survey describes biomass gasification, associated technologies and issues in three volumes. Volume I contains the synopsis and executive summary, giving highlights of the findings of the other volumes. In Volume II, the technical background necessary for understanding the science, engineering, and commercialization of biomass is presented. In Volume III, the present status of gasification processes is described in detail, followed by chapters on economics, gas conditioning, fuel synthesis, the institutional role to be played by the federal government, and recommendations for future research and development. (ERA citation 05:005492)

SERI/TR-33-239(V.2) PC A11/MF A01
Solar Energy Research Inst., Golden, CO.
Survey of Biomass Gasification. Volume II. Principles of Gasification
T. B. Reed. Jul 79, 241p
Contract EG-77-C-01-4042

Keywords: Biomass, Fuel gas, *Gasification, Ammonia, Anaerobic digestion, Bioconversion, Data, Economics, Gasoline, Methane, Methanol, Purification, Pyrolysis, Recommendations, Reviews, Synthesis, Waste processing, *Plants(Botany), Synthetic fuels, Solid wastes, Manufactured gas

Biomass can be converted by gasification into a clean-burning gaseous fuel that can be used to retrofit existing gas/oil boilers, to power engines, to generate electricity, and as a base for synthesis of methanol, gasoline, ammonia, or methane. This survey describes biomass gasification, associated technologies, and issues in three volumes. Volume I contains the synopsis and executive summary, giving highlights of the findings of the other volumes. In Volume II the technical background necessary for understanding the science, engineering, and commercialization of biomass is presented. In Volume III the present status of gasification processes is described in detail, followed by chapters on economics, gas conditioning, fuel synthesis, the institutional role to be played by the federal government, and recommendations for future research and development. (ERA citation 05:006661)

SERI/TR-33-239(V.3) PC A14/MF A01
Solar Energy Research Inst., Golden, CO.
Survey of Biomass Gasification. Volume III. Current Technology and Research
Apr 80, 302p
Contract EG-77-C-01-4042

Keywords: Biomass, *Gasification, Chemical reactors, Commercialization, Cost, Data compilation, Diagrams, Economics, Flowsheets, Graphs, Tables, Design, Directories, Manufacturers, Research programs, Air, Gas burners, Oil burners, Retrofitting, Hydrogenation, Scrubbers, Ammonia, Chemical reaction yield, Conversion, Gasoline, Methane, Methanol, Production, Synthesis gas, Financial incentives, Government policies, Grants, Recommendations, *Plants(Botany).

This survey of biomass gasification was written to aid the Department of Energy and the Solar Energy Research Institute Biological and Chemical Conversion Branch in determining the areas of gasification that are ready for commercialization now and those areas in which further research and development will be most productive. Chapter 8 is a survey of gasifier types. Chapter 9 consists of a directory of current manufacturers of gasifiers and gasifier development programs. Chapter 10 is a sampling of current gasification R and D programs and their unique features. Chapter 11 compares air gasification for the conversion of existing gas/oil boiler systems to biomass feedstocks with the price of installing new biomass combustion equipment. Chapter 12 treats gas conditioning as a necessary adjunct to all but close-coupled gasifiers, in which the product is promptly burned. Chapter 13 evaluates, technically and economically, synthesis-gas processes for conversion to methanol, ammonia, gasoline, or methane. Chapter 14 compiles a number of comments that have been assembled from various members of the gasifier community as to possible roles of the government in accelerating the development of gasifier technology and commercialization. Chapter 15 includes recommendations for future gasification research and development. (ERA citation 05:025595)

SERI/TR-352-554 PC A04/MF A01
Solar Energy Research Inst., Golden, CO.
Agricultural Sector Impacts of Making Ethanol from Grain
D. Hertzmark, D. Ray, and G. Parvin. Mar 80, 74p
Contract EG-77-C-01-4042

Keywords: *Agriculture, *Bioconversion, *Ethanol, Biomass, Biosynthesis, Cost, Data compilation, Economic impact, Graphs, Income, Maize, Net energy, Prices, Simulation, Soybeans, Statistical models, Stochastic processes, Supply and demand, Tables, Theoretical data, Usa.

This report presents the results of a model of the effects on the agricultural sector of producing ethanol from corn in the United States between 1979 and 1983. The model is aggregated at the national level, and results are given for all of the major food and feed crops, ethanol joint products, farm income, government payment, and agricultural exports. A stochastic simulation was performed to ascertain the impacts of yield and demand variations on aggregate performance figures. Results indicate minimal impacts on the agricultural sector for production levels of less than 1 billion gallons of ethanol per year. For higher production levels, corn prices will rise sharply, the agricultural sector will be more vulnerable to variations in yields and demands, and joint-product values will fall. Possibilities for ameliorating such effects are discussed, and such concepts as net energy and the biomass refinery are explored. (ERA citation 05:023776)

SERI/TR-51-195 PC A05/MF A01
Solar Energy Research Inst., Golden, CO.
Renewable Energy Sources for the World's Poor: A Review of Current International Development Assistance Programs
J. H. Ashworth. Oct 79, 81p
Contract EG-77-C-01-4042

Keywords: Developing countries, Low income groups, Renewable energy sources, Demonstration programs, *Wind energy, *Bioconversion, *Hydroelectric power, Financing, Global aspects, International cooperation, Research programs, *Solar energy.

Foreign assistance funding of the creation, testing, and use of renewable energy sources concerning worldwide efforts to provide energy for Third World development is examined. Donor agencies and developing nations give serious attention to technologies that have been considered exotic and marginal: small-scale hydroelectric generation, solar water heating and distillation, biomass conversion to methane gas and alcohol, wind power, photovoltaic-powered small-scale irrigation, and village-level solar-powered absorption refrigeration. An initial effort to assist in the international coordination of donor activity and in the sharing of information generated by foreign-assistance projects that use renewable energy sources is reported. The report mainly provides information about specific development projects. It contains only a few of the projects that have been approved and funded by 1 June 1979. (ERA citation 05:008716)

SERI/TR-751-748 PC A13/MF A01
Solar Energy Research Inst., Golden, CO.
Passive Solar Energy Information User Study
W. W. Belew, B. L. Wood, T. L. Marle, and C. L. Reinhardt. Nov 80, 276p
Contract AC02-77CH00178

Keywords: Passive solar cooling systems, Passive solar heating systems, Architects, Construction industry, Education, Information, Information needs, Manufacturers, Solar energy, Surveys, Uses, *Solar heating systems, *Solar cooling systems, *Information services.

The results of a series of telephone interviews with groups of users of information on passive solar heating and cooling are described. These results, part of a larger study on many different solar technologies, identify types of information each group needed and the best ways to get information to each group. The overall study provides baseline data about information needs in the solar community. An earlier study identified the information user groups in the solar community and the priority (to accelerate solar energy commercialization) of getting information to each group. In the current study only high-priority groups were examined. Results from seven passive groups respondents are analyzed in this report: Federally Funded Researchers, Manufacturer Representatives, Architects, Builders, Educators, Cooperative Extension Service County Agents, and Homeowners. The data will be used as input to the determination of information products and services the Solar Energy Research Institute, the Solar Energy Information Data Bank Network, and the entire information outreach community should be preparing and disseminating. (ERA citation 06:007407)

SERI/TR-751-753 PC A11/MF A01
Solar Energy Research Inst., Golden, CO.
General Solar Energy Information User Study
W. W. Belew, B. L. Wood, T. L. Marle, and C. L. Reinhardt. Mar 81, 237p
Contract AC02-77CH00178

Keywords: *Solar energy, Information centers, Information dissemination, Information needs, *Information services, Professional personnel, Statistics, Surveys, Tables.

This report describes the results of a series of telephone interviews with groups of users of information on general solar energy. These results, part of a larger study on many different solar technologies, identify types of information each group needed and the best ways to get information to each group. The report is 1 of 10 discussing study results. The overall study provides baseline data about information needs in the solar community. An earlier study identified the information user groups in the solar community and the priority (to accelerate solar energy commercialization) of getting information to each group. In the current study only high-priority groups were examined. Results from 13 groups of respondents are analyzed in this report: Loan Officers, Real Estate Appraisers, Tax Assessors, Insurers, Lawyers, Utility Representatives, Public Interest Group Representatives, Information and Agricultural Representatives, Public Interest Group Representatives, Information and Agricultural Specialists at State Cooperative Extension Service Offices, and State Energy Office Representatives. The data will be used as input to the determination of information products and services the Solar Energy Research Institute, the Solar Energy Information Data Bank Network, and the entire information outreach community should be preparing and disseminating. (ERA citation 06:016628)

SERI/TR-98175-1 PC A08/MF A01
Dynatech R/D Co., Cambridge, MA.
Feasibility Study for Anaerobic Digestion of Agricultural Crop Residues. 1980 Update. Final Report
C. E. West, and E. Ashare. Mar 81, 170p
Contract AC02-77CH00178

Keywords: *Agricultural wastes, Anaerobic digestion, Maize, *Methane, Animal feeds, Batch culture, Biosynthesis, Continuous culture, Cost, Economic analysis, Farms, Feasibility studies, Fertilizers, Waste product utilization, *Animal wastes.

The objective of this study was to provide cost estimates for the digestion of corn stover to fuel gas. Engineering economic analyses were performed for digestion of corn stover for small farm cooperative and industrial scales. The small farm scale processed the residue from an average size U.S. farm (400 acres), and the other sizes were two and three orders of magnitude greater. Recent experimental results obtained by Gaddy and by McCarty for yield and kinetics of corn stover digestion were used in the analysis. The results of the analyses indicate that production of fuel gas from corn stover is, at least, marginally economically feasible for both continuous and batch digestion processes. A sensitivity analysis was performed to assess which parameters significantly affect system economics. It was found that a credit for digester effluent would yield economically feasible process. Recommendations arising from this study include continued development of a batch hole-in-the-ground controlled landfill digestion of corn stover and investigations into the effect of shorter retention time continuous digestion. The digester effluent should also be evaluated to determine its use as an animal feed or fertilizer. (ERA citation 06:021730)

SERI/TR-98372-1 PC A05/MF A01
Science and Education Administration, Clay Center, NE. Meat Animal Research Center.
Anaerobic Fermentation of Beef Cattle Manure. Final Report
A. G. Hashimoto, Y. R. Chen, and V. H. Varel. Jan 81, 76
Contract AC02-77CH00178

Keywords: *Manures, *Methane, Anaerobic digestion, *Animal feeds, Biosynthesis, Cattle, Chemical reactors, Cost, Economic analysis, Energy consumption, Experimental data, Kinetics, Operation, Optimization, Performance, Pilot plants, Productivity, Proteins, Slurries, Theoretical data, Thermophilic conditions, *Bioconversion, *Animal wastes.

The research to convert livestock manure and crop residues into methane and a high protein feed ingredient by thermophilic anaerobic fermentation are summarized. The major biological and operational factors involved in methanogenesis were discussed, and a kinetic model that describes the fermentation process was presented. Substrate biodegradability, fermentation temperature, and influent substrate concentration were shown to have significant effects on CH sub 4 production rate. The kinetic model predicted methane production rates of existing pilot and full-scale fermentation systems to within 15%. The highest methane production rate achieved by the fermenter was 4.7 L CH sub 4 /L fermenter day. This is the highest rate reported in the literature and about 4 times higher than other pilot or full-scale systems fermenting livestock manures. Assessment of the energy requirements for anaerobic fermentation systems showed that the major energy requirement for a thermophilic system was for maintaining the fermenter temperature. The next major energy consumption was due to the mixing of the influent slurry and fermenter liquor. An approach to optimizing anaerobic fermenter designs by selecting design criteria that maximize the net energy production per unit cost was presented. Based on the results, we believe that the economics of anaerobic fermentation is sufficiently favorable for farm-scale demonstration of this technology. (ERA citation 06:018280)

SERI-36 PC A04/MF A01
Solar Energy Research Inst., Golden, CO.
Small Power Systems Study. Quarterly Report No. 1
J. P. Thornton, C. J. Bishop, K. C. Brown, and A. L. Edgecombe. 1 Jul 78, 54p
Contract EG-77-C-01-4042

Keywords: *Solar thermal power plants, Comparative evaluations, Cost, Performance, Power range 1-10 mw, Remote areas, Rural areas, Solar collectors, Electric power plants.

Recent studies have suggested a significant potential for small solar-thermal electric power generating plants to be used by small communities, rural areas, and remote load centers. The Small Power Systems Program has been initiated by the Department of Energy to explore the technical, economic, and institutional feasibility of small power plants. SERI, in conjunction with Jet Propulsion Laboratory and Battelle Pacific Northwest Laboratories, has been contracted by the Department of Energy to perform a comparative analysis and ranking of various solar thermal generic systems with capacities in the 1 to 10 MW/sub e/ range. The systems will be evaluated to a predetermined set of criteria which will include factors such as safety, environmental status, cost, and performance. (ERA citation 04:029633)

SHR-0000101 PC A04/MF A01
National Association of Counties Research Foundation, Washington, D.C.
Rural Human Resources Project
Status Rept.
1974, 70p
Grant OEO-30094G-73-01
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0000101/ES.

Keywords: *Social services, Multistate government, State government, Relationship, Private organizations, National government, Methodology, Management, Local government, Integration, Coordination, Counties, Alabama, Arkansas, Iowa, Minnesota, Montana, New York, Oregon, Pennsylvania, Rural areas.

A quarterly progress report presented by the National Association of Counties Research Foundation provides descriptions of current activities of the Rural Human Resources Project, designed to help rural counties respond to the human services needs of their citizens. Participating in the project are the State association of counties in Alabama, Arkansas, Iowa, Minnesota, Montana, New York, Oregon, and Pennsylvania. Part One presents an overview of the eight-State project with emphasis on the development of closer ties between the State associations of counties and local community action agencies. Human services integration at the county level is discussed, together with a description of the roles played by the new staff position added by each State association -- human resources coordinator, and presents individual status reports for each participating State. These reports describe the conditions under which human services are delivered in each State, the principal objectives of each State's project, and current progress. Human resources coordinators for the project are listed by name and address.

SHR-0001658 PC A07/MF A01
Office of Human Development, Washington, DC. Office of Rural Development.
Getting Human Services to Rural People
Final Rept.
Jun 76, 147p Rept no. HEW/ORD/DC-76/06
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0001658/ES.

Keywords: *Social services, Rural areas, Delivery, Services, Service related organizations, Regulations, Program financing, Position(Location), Population migrations, Planning, Outreach, Organizing, Organizations, Organization theory, Operations, Methodology, Management, Management systems, Local government, Legislation, Integrated services, Input, Inadequacies, Government, Financing, Federal aid, Evaluation, Effectiveness, Coordination, Consumers, Constraints, Community relations, Communicating, Clients, Capacity, Capabilities, Agency role, Abilities.

The results of field evaluations of 11 rural human services projects are reported, barriers to the delivery and receipt of services in rural areas are identified, and implications for action by DHEW are discussed. The projects visited, nine of which received DHEW funds, operated within generally similar contexts: rural agricultural communities with dispersed populations and high levels of poverty. However, the projects varied considerably in the number and type of services provided and in the primary target groups served. A strongly constituted board of directors was found to be one good indicator of a strong project. Projects with broadly defined target groups and diverse goals appeared weaker than those with narrower target groups and well defined, integrated goals and objectives. All projects expended high levels of effort on obtaining funding. Recognition of the need for interagency cooperation was widespread. Planning and evaluation components were generally weak. Barriers to effective delivery of DHEW services in rural areas include transportation problems, lack of information about rural projects, limited flexible funding and staff capacity at the local area, and attitudinal problems, as exemplified in the common belief that DHEW's involvement in rural affairs is inappropriate. It is recommended that a long-range national strategy for rural development be established and that a commitment be made to providing dollar and manpower resources for overcoming imbalances between rural and urban America. Case studies are presented for 8 of the 11 projects visited.

SHR-0002289 PC A04/MF A01
Bay Cove Community Mental Health Center, Boston, MA.
Needs Assessment: A Working Manual
Phyllis Q. Schmitt. 19 Oct 77, 64p

Keywords: Requirements, *Social services, Statistical data, Analyzing, Assessments, Characteristics, Clients, Confidentiality, Data acquisition, Data processing, Data, Demography, Forecasting, Information, Input, Management systems, Management, Mathematical analysis, Measurement, Methodology, Planning, Simulation.

This manual presents a multilevel, multisource approach to needs assessment, from which the reader may choose methods within his / her capabilities and interests. Each chapter contains a series of approaches in gathering and handling data, beginning with the simplest and ending with the most complex. The initial chapter covers use of objective measures which already exist (census data) or which can be compiled (record search material). Discussion then proceeds to methods of obtaining expert opinion from community leaders. Several methods of conducting a 'felt need survey' to collect data are described. Alternative ways of obtaining information from the target population, the group who already has or has had problems with the entity under study, are also presented. Finally, a plan for action summarizes the monograph, including a hypothetical example of a needs assessment survey. The example illustrates the combination of the foregoing methods. A number of sections stress the importance of the confidentiality of information where it could be injurious or embarrassing to the community. Brief illustrations serve as simple working examples of principles discussed in the text. Exhibits are included for users of the manual to serve as prototypes in creating their own charts and graphs. Textual references and the table of contents direct the reader to these aids. Portions of this document are not fully legible.

SHR-0002580 PC A03/MF A01
Health and Welfare Council, Inc., Media, PA.
Needs Assessment in Community Planning: An Evaluation of Ten Approaches
Feb 78, 30p

Keywords: Assessments, Requirements, *Social services, Agency role, Cases, Clients, Communicating, Community relations, Consumers, Coordination, Core services, Delivery, Direct services, Feedback, Flow control, Followup contacts, Followup, Forecasting, Input, Intake, Integration, Interactions, Interrelationships, Management systems, Management, Measurement, Methodology, Organizing, Planning, Program effectiveness, Reasons, Services, Social indicators, Statistical data, *Community development.

Needs assessment remains the most fundamental aspect of any human services program. Poor evaluations of many programs result from errors made during the needs assessment phase of the program planning process. Needs assessment is the process of identifying and describing individual, family, or community conditions that may be amenable to total or partial amelioration through a human services program. Information gathered in needs assessment studies is used to set goals, program objectives, and priorities, and thus, influences the effectiveness of service delivery. By documenting problems, it justifies the development and implementation of a specific program. In the same vein, it determines the continuing validity of the goals, objectives, and services of an existing program. This pamphlet, distributed by the Health and Welfare Council, attempts to give a general introduction to needs assessment through a pragmatic examination of ten methods commonly used by planners and program developers. The techniques examined include: (1) the community survey; (2) the experience survey; (3) the available data approach; (4) the resource inventory; (5) the consumer demand approach; (6) the outreach approach; (7) public hearings and forums; (8) demonstration projects; (9) social indicators; and (10) beneficiary analysis. Exploration of the concept of needs shows that community service needs can be viewed as either manifest (clearly evident) or latent (felt to be present). The former is broken down into expressed and felt needs, while the latter is divided into inferred, ascribed, and comparative needs. Each technique is evaluated in terms of its ability to assess each of these categories of community needs.

SOLAR/0802-79/01 PC A10/MF A01
Ehrenkrantz Group, New York.
Active Solar Energy System Design Practice Manual
Oct 79, 222p
Contract EG-77-C-01-2522

Keywords: *Solar collectors, *Solar heating systems, Demonstration programs, Design, Equipment, Heat storage, Installation, Leaks, Manuals, Safety, Supports.

This manual is divided into liquid and air systems. The following are covered: collectors, collector arrays, mounting and support, storage, dampers, leakage concerns, safety and protection, and other equipment. (ERA citation 05:020410)

SRO-888-1 PC A04/MF A01
Georgia Univ., Athens.
Multidisciplinary Research Program Directed Toward Utilization of Solar Energy Through Bioconversion of Renewable Resources. Progress Report
W. R. Finnerty. Jul 76, 73p
Contract E(38-1)-888

Keywords: *Bioconversion, *Solar energy, Solar energy conversion, Trees, Resins, Biosynthesis, Clone cells, Growth, Herbicides, Phenotype, Plant stems, Research programs, Plants(Botany), Genetics.

Progress is reported in four research areas of solar bioconversion. The first program deals with the genetic selection of superior trees, physiological basis of vigor, tissue culture, haploid cell lines, and somatic hybridization. The second deals with the physiology of paraquat-induced oleoresin biogenesis. Separate abstracts were prepared for the other two program areas: biochemical basis of paraquat-induced oleoresin production in pines and biochemistry of methanogenesis. (ERA citation 02:000461)

SVF-57 PC A03/MF A01
Stiftelsen foer Vaermeteknisk Forskning, Studsvik (Sweden).
Efficient Burning of Wood Waste
O. Rydin. Dec 77, 41p
U.S. Sales Only.

Keywords: *Paper industry, *Wood wastes, Boiler fuel, Combustion, Scandinavia, *Fuels, Sweden, Solid waste disposal, *Waste disposal, Reclamation, Refuse disposal.

Bark and other wood waste, hogged fuel, is commonly burned in Scandinavian pulp- and lumber mills. Combined burning together with fuel oil is a common scheme in the pulp mills. Some problems, e.g., decreased efficiency in burning, are discussed, and a joint Scandinavian research programme is proposed. The purpose of the program is to investigate: (1) the formation and composition of fireside tube deposits in combined bark and oil fired boilers; (2) the influence of oil additives on such deposits, i.e., the possibility of reducing flue gas temperature from combined fired boilers without creating corrosion or dust deposition problem; (3) the corrosion of different superheater materials when bark containing chlorides is burned, and (4)

the impact of bark moisture on boiler efficiency, capacity and dust carry over. (ERA citation 03:055389)

TID-22781 PC E02/MF A01
Battelle Columbus Labs., OH.
Fuels from Sugar Crops: Systems Study for Sugarcane, Sweet Sorghum, and Sugar Beets
R. A. Nathan. Jul 78, 148p

Keywords: *Ammonia, *Ethanol, *Sorghum, *Sugar beets, *Sugarcane, Acetic acid, Biosynthesis, Cultivation techniques, Economics, Feasibility studies, Fermentation, High btu gas, Information needs, *Methanol, Recommendations, Reviews, Synthesis, Synthesis gas, Technology assessment, Thermochemical processes, *Bioconversion, Manufactured gas, Snythetic fuels, Anaerobic processes.

An extensive analysis is made of the technical and economic feasibility of producing fuels and chemicals from the sugar crops (sugar cane, sweet sorghum, and sugar beets). It is concluded that ethanol and ammonia are the most promising products. Ethanol produced by fermentation on juice or molasses is close to economic competitiveness. The ammonia cost is not yet competitive but could be competitive with coal-produced ammonia. Sugar cane appears to be the most promising crop in the short and intermediate term; sweet sorghum has the greatest long-range appeal. The development of processes to manufacture ammonia, methanol, acetic acid, and thermochemical substitute natural gas (SNG) from sugar crop residues depends on technology to generate synthesis gas. Anaerobic digestion of sugar cane or juices to SNG is not attractive on economic grounds. The agricultural aspects of sugar crops research are summarized. Energy balances of input/output are derived for sugar cane and sugar beets. Recommendations are made for USDOE actions and policy decisions. (ERA citation 04:002696)

TID-26786 PC A03/MF A01
Auburn Univ., AL.
Potential for Conversion and Utilization of Solar Energy in Poultry Production. Progress Report Covering the Period from September 15, 1974 to January 31, 1975.
R. N. Brewer, and J. R. Dunn. 28 Jan 75, 34p

Keywords: *Poultry, Agriculture, Energy demand, *Solar energy, Fowl, Production.

For abstract, see NSA 7504

TID-26889 PC A04/MF A01
Puerto Rico Nuclear Center, San Juan.
Evaluation of the Emery Dredge for Determining Numbers of Snails in Tropical Reservoirs.
W. R. Jobin, and F. F. Ferguson. 1973, 56p

Keywords: *Diseases, Snails, Abundance, Pest control, Planning, *Schistosomiasis, Puerto rico, Populations, Sampling, Water reservoirs.

Since control of the aquatic snails which transmit schistosomes can be very expensive in large hydroelectric and irrigation reservoirs, it is important to understand precisely the dynamics of these snail populations in order to plan efficient programs for their control. Thus sampling methods are needed to measure the numbers of snails in the reservoirs and this report concerns the use and evaluation of the Emery dredge in nine reservoirs in Puerto Rico. The results showed that the Emery dredge could be utilized under certain conditions to accurately estimate numbers of snails in these reservoirs. In addition field results showed that Biomphalaria glabrata could be stranded by water receding very slowly and that they were highly resistant to desiccation. These results are important for planning snail control through periodic fluctuation of the water level.

TID-27060 PC A02/MF A01
Energy Research and Development Administration, Washington, DC. Div. of Buildings and Industry.
State Research Priorities for Energy Conservation in Buildings and Agriculture
1975, 18p

Keywords: *Energy conservation, Meetings, Agriculture, *Buildings, Economics, Fertilizers, Natural gas, Production, Reviews, Solar energy conversion, Synthetic fuels, Thermal insulation

Highlights are given of Federal and State presentations at a conference on research priorities for energy conservation in buildings and agriculture held in Chicago on Oct. 20, 1975. The conference was sponsored jointly by US ERDA and the National Governor's Conference. The five top priority categories recommended by the States for Federal R and D related to energy conservation in buildings were: insulation materials; technology transfer; economic factors; solar heating and cooling; and construction techniques. The top priority items recommended for research on energy conservation in agriculture were: development of substitute fuels for natural gas; improved fertilizer production processes; energy production from wastes; more efficient crop-drying techniques; and more efficient food- and fiber-processing methods. (ERA citation 01:023564)

TID-27164 PC A15/MF A01
Cornell Univ., Ithaca, NY.
Bioconversion of Agricultural Wastes for Pollution Control and Energy Conservation. Final Report
W. J. Jewell, H. R. Davis, W. W. Gunkel, D. J. Lathwell, and J. H. Martin, Jr. Sep 76, 341p
Contract ERDA-NSF-741222A01

Keywords: *Bioconversion, *Waste recycling, *Manures, *Methane, Air pollution, Anaerobic digestion, Biosynthesis, Economics, Energy conservation, Feasibility studies, Land pollution, Water pollution, *Agricultural wastes, Air pollution control, Water pollution control.

The combination of concerns for energy shortages and pollution control has renewed interest in the possibility of generating energy from organic wastes. This report is a comprehensive study of the feasibility of generating a substitute natural gas on U. S. dairies (40 and 100 cows) and beef feedlots (1000 head) using the anaerobic fermentation process. The feasibility in technical, economic and practical terms is estimated. Excluding energy use in manufacture of equipment and farm chemicals, the total energy use on 40 and 100 cow dairies, and 1000 head feedlots were estimated to be 164 x 10 exp 6 , 307 x 10 exp 6 , and 670 x 10 exp 6 kcal per year, respectively. The estimated maximum annual methane energy that could be generated on these operations was estimated as 216 x 10 exp 6 , 473 x 10 exp 6 , and 2280 x 10 exp 6 kcal, respectively. Thus, a dairy farm in northern New York could produce more energy than it consumes, and a feedlot could produce more than 3 times the quantity consumed. The estimated costs of generating methane on 40 and 100 cow dairies and on a 1000 head beef feedlot were $22.80, $13.40, and $4.50 per 10 exp 6 kcal. Detailed analyses of the three operations estimated that the actual costs for utilization would increase to $80, $39, and $11 per 10 exp 6 kcal for specific operations, respectively. Farms with more than 100 cows can begin to consider the technology as an income producing operation. It is therefore concluded that anaerobic fermentation of agricultural wastes has significant potential and should receive increased attention. (ERA citation 02:021947)

TID-27600 PC E02/MF A01
Federal Power Commission, Washington, DC. Bureau of Natural Gas.
Maintenance and Adjustment Manual for Natural Gas and No. 2 Fuel Oil Burners
1977, 52p

Keywords: *Burners, Furnaces, Industrial plants, *Energy conservation, Combustion, Efficiency, Fuel consumption, Fuel oils, Fuel-air ratio, Maintenance, Measuring methods, Natural gas, Operation, Process heat, Manuals, Thermal efficiency.

With the nation facing fuel shortages, there is considerable interest in various techniques for conserving fuel. Fuel savings of 10 to 30% appear likely when burner equipment is properly adjusted and maintained. This manual is intended as a practical contribution to bring about greater energy efficiency by describing adjustment and measurement procedures for some natural-gas and No. 2 fuel-oil burners. Because of the many variations among burner types, details peculiar to individual installations cannot be included. It is assumed that burner manufacturers' specifications are being followed by those maintaining burners. For safety reasons one should never undertake a burner adjustment without proper training according to burner manufacturers' specifications. This manual is directed toward answering the following three questions: does burner adjustment increase efficiency and reduce fuel consumption without sacrificing production; how can one determine whether a system is operating efficiently or whether it is wasting, sometimes, substantial amounts of fuels; and what adjustments must be made after a system has been found to be operating inefficiently. (ERA citation 03:007050)

TID-27834 PC A08/MF A01
Battelle Columbus Labs., OH.
Fuels from Sugar Crops. Second Quarterly Report
E. S. Lipinsky, S. Kresovich, T. A. McClure, E. W. Helper, and W. T. Lawhon. 31 Oct 77, 167p
Contract W-7405-ENG-92

Keywords: *Bioconversion, *Ethanol, *Sorghum, *Sugar beets, *Sugarcane, Biosynthesis, Brazil, Climates, Cultivation techniques, Diagrams, Drying, Economics, Fermentation, Florida, Flowsheets, Louisiana, Maps, Processing, Recovery, Research programs, Tables, Texas, Waste heat, Yields, Biological energy conversion, Manufactured gas, Synthetic fuels.

Substantial progress was made on both the agricultural and the processing aspects of the fuels from biomass research program. Despite droughts and hurricanes, yields on narrow row spacings show substantial gains over conventional spacings at all locations for both sugarcane and sweet sorghum. The biomass gains are most pronounced (40% to 100% increase) for Louisiana sugarcane and for sweet sorghum in Louisiana and Texas (50 to 100% gains). Although biomass increases are smaller in Florida, early ripening and possible soil conservation effects cause interest in close spacing in Florida to be maintained. The concept of integrating sweet sorghum production with sugarcane production could expand the area available for extensive sugar crop production by a factor of 10 or more. Sugar beets and sweet sorghum mesh together well from an agronomic viewpoint and the introduction of the Canadian Separator Equipment Process may make feasible integration of the processing of these crops. Evaluation of U.S. and Brazilian ethanol technology indicates that ethanol can be made quite economically in locations with long sugarcane processing seasons (e.g., Hawaii and Puerto Rico). The Melle Process practiced in Brazil appears to make possible extremely short fermentation times (10 to 16 hours, compared with 24 to 30 hours for U.S. practices). The primary key to reducing processing costs lies in increasing the concentration of ethanol in the fermented mash, not reduction in fermentation time. Suggestions for appropriate improvements have been made and the Reports of Invention filed with DOE's patent office. Five appendices are included. (ERA citation 03:030557)

TID-28044 PC A14/MF A01
Energy Research and Development Administration, Washington, DC.
Guide to Demonstrations of Energy Conservation, Solar Energy and Other New Technologies: Energy Extension Service
N. Ignatius. Sep 77, 307p

Keywords: *Solar water heating, *Wind energy, *Bioconversion, Agriculture, *Buildings, Commercial buildings, *Energy conservation, *Geothermal energy, Houses, Industrial plants, *Process heat, Solar cell arrays, *Solar cooling systems, *Solar heating systems, Solar water heaters, Wind power, Manuals, Biomass, Demonstration programs, Farms, Greenhouses, Office buildings, Passive solar heating systems, Planning, Residential sector, School buildings, Solar air conditioning, Solar energy, Solar heating, Solar space heating, Underground, USA, Subsurface structures.

This guide was compiled by the Energy Extension Service (EES) for use by State EES planners. It is intended to facilitate viewing of solar, conservation, and other energy technologies at work. The demonstrations listed in this Guide have generally been limited to those most applicable to individual homeowners, small businesses, schools, and farms. In a few states, however, municipal systems have also been included. Many of these projects have received Federal funding. The majority of projects demonstrate some form of solar energy. In addition to solar heating and cooling for homes and commercial buildings, a number of examples of farm applications such as solar crop drying are listed, as well as demonstrations of wind energy, biomass, photovoltaics, etc. Since all successful solar heating and cooling systems incorporate sensible

energy-conserving design, each solar heating and/or cooling project is at the same time an energy-conservation project. When these conservation designs are of special interest or inventiveness, this has been noted. In a few cases, projects demonstrate only conservation measures, such as the construction of buildings underground. (ERA citation 03:018509)

TID-28550 PC **A05**/MF **A01**
Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.
Sugarcane Production Residues: Technologic and Economic Assessment of Methods for Conversion to Utilizable Energy Forms. Final Report
R. A. Nordstedt, P. H. Smith, L. O. Bagnall, and F. le Grand. 1976, 82p

Keywords: *Agricultural wastes, *Bioconversion, *Waste recycling, Anaerobic digestion, Bagasse, Combustion, *Pyrolysis, Comparative evaluations, Economics, Florida, Inventories, *Methane, Pyrolytic oils, Steam generation, Technology assessment, Refuse derived fuels, Feasibility, Solid waste disposal, Synthetic fuels, Manufactured gas.

This report examines the technologic and economic feasibility of converting sugarcane production residues in South Florida to utilizable energy forms. Quantity and location of the residues are given. Current uses of the residues are outlined and compared with other potential uses which are described in the literature. Technological problems in collection of the field residues are discussed. The resulting research and development needs are outlined. An in-depth economic comparison of anaerobic digestion, shaft pyrolysis, and waterwall incineration is presented. Economic feasibility of each of the three processes is presented as a function of plant size using current market prices for energy and the energy price increases which would be necessary to make each of the processes economically feasible. (ERA citation 04:0 7640)

TID-28552 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Technical and Economic Assessment of Methods for Direct Conversion of Agricultural Residue to Usable Energy. Final Report
R. C. Bailie. 20 Oct 76, 136p

Keywords: *Waste recycling, *Bioconversion, *Agricultural wastes, *Ethanol, Low btu gas, *Methane, Acid hydrolysis, Anaerobic digestion, Biosynthesis, Chemical reactors, Comparative evaluations, Feasibility studies, Fermentation, Fischer-tropsch synthesis, Flowsheets, Hydrogenation, Mesophilic conditions, Production, Pyrolysis, Tables, Thermophilic conditions, Time dependence, Manufactured gas, Synthetic fuels, Solid waste disposal, Forecasting, Refuse derived fuels.

Various methods for conversion of agricultural wastes to usable energy were evaluated for further consideration for user operated and commercially operated systems. Advantages and disadvantages of anaerobic digestion and low Btu gas pyrolysis, the only two alternatives that were considered to be worthy of evaluation for user operated systems, are discussed. Both systems were also considered feasible for use with commercially operated systems. In addition, two liquid product systems, hydrolysis and fermentation to ethanol and medium Btu gas pyrolysis followed by Fischer-Tropsch reaction to form a liquid product, were evaluated. (ERA citation 04:018341)

TID-29403 PC **A08**/MF **A01**
Puerto Rico Univ., Rio Piedras.
Production of Sugarcane and Tropical Grasses as a Renewable Energy Source. First Annual Report, June 1, 1977-May 31, 1978
A. G. Alexander, C. Gonzalez-Molina, and J. Ortiz-Velez. 1978, 104p
Contract EG-77-G-05-5422

Keywords: *Grass, Sorghum, *Sugarcane, Biomass, Clone cells, Cloning, Comparative evaluations, Fertilization, Harvesting, Plant growth, Plant growth regulators, Productivity, Renewable energy sources, Solar drying, Tropical regions, *Fuels.

Tropical grasses from Saccharum and related genera are being evaluated as candidates for intensive production of solar-dried biomass. Categories of candidate grasses include short-, intermediate-, and long-rotation species for intensive co-production with conventional food commodities. Minimum-tillage candidates are also sought for extensive production on marginal lands. The hybrid forage grass Sordan 70-A (Northrup-King Company) is the outstanding short-rotation plant tested to date. It completes both the tissue-expansion and maturation phases within 10 weeks, yielding at least 4 tons of oven-dry biomass per acre. Napier grass (var. Common Merker) is a promising intermediate-rotation crop which possibly may be exceeded by several napier grass hybrids. Interspecific Saccharum hybrids and the Saccharum species S. spontaneum and S. sinense are being investigated for both long-rotation and minimum tillage cropping. Direct comparisons of sugarcane hybrids with napier grass indicate that sugarcane is an inferior candidate for short-term production of tropical forages. Sugarcane responded well to narrow spacing for about 6 months after seeding. Napier grass failed to respond to close spacing. Both species increased yields with decreasing frequency of harvest. Fertilization rates based on conventional sugar and forage production data were inadequate to sustain maximum biomass yields. Candidate grasses have shown two discrete biomass production phases, ie , tissue expansion which is highly visible but consists mainly of water, and tissue maturation which has little visibility but yields the bulk of the plants' dry matter. Additional progress was made in sugarcane growth control with chemical growth regulators. (ERA citation 04:052801)

TID-3351-R1P1 PC **A25**/MF **A01**
Energy Research and Development Administration, Oak Ridge, TN. Technical Information Center.
Solar Energy. A Bibliography: citations.
Mar 76, 592p*

Keywords: Solar energy conversion, Bibliographies, *Solar energy, *Tidal energy, *Information services, Photovoltaic power system, *Solar thermal power plants, Solar sea power plants, *Solar collectors, Solar energy concentrators.

Citations of 9732 references to scientific and technical literature on the use of solar energy are included in TID-3351-R1P1. Arranged chronologically within subject category, the citations begin as far back as useful references could be obtained and continue through 1975. Subjects include resources and availability; economics; environmental aspects; solar energy conversion; photovoltaic, solar thermal, and ocean thermal gradient power plants; solar collectors and concentrators; and tidal power. Personal and corporate author, subject, and report number indexes are in a companion volume, TID-3351-R1P2. (ERA citation 01:012726)

TID-3351-R1P2 PC **A18**/MF **A01**
Energy Research and Development Administration, Oak Ridge, TN. Technical Information Center.
Solar Energy. A Bibliography: Indexes.
Mar 76, 400p*

Keywords: Solar energy conversion, Bibliographis, *Solar energy, Tidal power, *Information services, Authors, Corporate authors, Subject index terms.

Personal and corporate author, subject, and report number indexes are presented for the 9732 citations contained in TID-3351-R1P1. (ERA citation 01:012727)

TT-67-51215 PC **A08**/MF **A01**
National Science Foundation, Washington, D. C. Special Foreign Currency Science Information Program.
Practical Course in Storage and Processing of Fruit and Vegetables.
E. P. Shirokov. 1968, 172p Rept no. SFCSI-Agr(TT-67-51215)
Trans. of mono. Praktikum po khraneniyu i Pereraborke Plodov i Ovoshchei, Moscow, 1964 246p.

Keywords: *Food Products, *USSR, Agriculture, *Fruits, *Potatoes, *Vegetables, Processing, Storage, Preservation, Dehydrated foods, *Food processing.

Contents: Evaluation of quality and chemical composition of potatoes, vegetables, fruit, and processed products--Commercial and organoleptic quality evaluation of potatoes, vegetables, fruit, and processed products; Physicochemical methods of evaluating fresh potatoes, vegetables, and fruit; Physicochemical evaluation methods of processed fruit and vegetables. Storage of potatoes, vegetables, and fruit--General problems of storing potatoes, vegetables, and fruit; Storing potatoes and vegetables in clamps and trenches; Storing potatoes, vegetables, and fruit in storehouses; Methods of research work on storing potatoes, vegetables, and fruit. Processing of vegetables, fruit, and potatoes--Biochemical preservation methods; Dehydration of fruit and vegetables; Vinegar-pickling; Preservation by sterilization in sealed containers; Tomato products; Preserving with sugar; Juices; Processing of potatoes into starch; Sulfitation of fruit and berries; Methods of scientific research work on processing fruit and vegetables.

TT-67-51301 PC **A04**/MF **A01**
National Science Foundation, DC. Special Foreign Currency Science Information Program.
Importance of Trace Element in Chernozem Soils under Conditions of Dry Farming, and Their Influence on the Physiological Processes Determining the Drought-and Heat-Resistance of Plants.
M. Ya. Shkolnik, and N. A. Makarova. 1968, 54p
Rept no. SFCSI-Agr(TT-67-51301)
Trans. of Akademiya Nauk SSSR. Botanicheskii Institut. Trudy: Seriya IV, Eksperimentalnaya Botanika, n12 p23-73 1958.

Keywords: *Agriculture, Fertilizers, *Soils, USSR, Biochemistry, Tracer studies, Soil mechanics, Boron, Moisture, Cereals, Potatoes, Rural areas, Chernozem soils.

The present work consists of two sections: the first presents the data of our investigations of the influence of trace elements on the yield and the chemical composition of plants on chernozem soils under dry-farming; the second section deals with the influence of trace elements on the physiological processes determining the drought-resistance of plants. (Author)

TT-68-50103 PC **A14**/MF **A01**
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Norms and Tables for Animal Nutrition
Mihailo Fedorovic-Tome, Miodrag Obradovic, and Darko Stosic. 1970, 320p Rept no. SFCSI-Agr(TT-68-50103)
Trans. of mono. Norme i Tablice za Ishranu Stoke, Belgrade, 1967 490p, by Dorde Krivokapic.

Keywords: *Animal husbandry, Animal nutrition, Tables(Data), Feeding stuffs, Food habits, Handbooks, Cattle, Horses, Sheep, Goats, Swine, Wildlife, *Poultry, Translations, *Yugoslavia, USSR, Mink, Pelts.

Contents: Nutrition norms and rations for domestic animals (Cattle feeding norms and rations, Nutrition norms and rations for swine, Nutrient requirements and rations for sheep, Nutrient requirements and rations for horses, Nutrition norms and rations for rabbits, Nutrition norms and rations for poultry); Norms, mixtures and rations as compiled by certain foreign and Yugoslav authors (Other norms and formulae for their conversion into different units, Morrison's feeding norms, American N.R.C. feeding standards, Danish standards, Norms based on the requirements of individual types and categories of animal stock for the most important nutritive substances, Norms applied in Sweden, Amino acids requirements for swine and poultry balancing rations and mixtures according to the amino acid content in feeds, Examples of evaluating feed values, rations and mixtures according to the amino acid content); Composition and nutritive value of animal feed (Methods of determining oat units, Use of the tables for composing rations and mixtures); Examples of rations and mixtures (Feed mixtures for cattle, Some American additional mixtures for cattle during finishing with roughages. Rations which can be recommended and used for the nutrition of cows in Yugoslavia according to Yugoslav authors, Rations and mixtures for swine, Rations and mixtures for poultry, Mineral mixtures for domestic animals).

TT-68-50342 PC **A16**/MF **A01**
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Woodworking in Estonia: Historical Survey.
A. Viires. 1969, 352p* Rept no. SFCSI-Smi(TT-68-50342)
Trans. of mono. Eesti Rahvaparane Puutoondus. Ajalooline Ulevaade, Tallinn, 1960 333p, by J. Levitan.

Keywords: *Wood products, Wood, Material forming, Culture, *USSR, Rural areas, Trees, Small tools, Containers, Bending, Vehicle chassis components, Roofs, Joining, Anthropology, Economics, Social anthropology, Estonia, *Woodworking, Turning(Woodworking), *Handicrafts, *Furniture.

The document considers the importance of home industry with particular reference to woodworking, in Estonian village economy.

TT-68-50363 PC A08/MF A01
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Sown Winter Ranges in the Foothill Deserts of Soviet Central Asia.
N. T. Nechaeva, and S. Ya. Prikhodko. 1968, 167p
Rept no. SFCSI-Agr(TT-68-50363)
Trans. of mono. Iskusstvennye Zimine Pastbishcha v Predgornykh Pustynyakh Srednei Azii. (Opyt Sozdaniya Iskusstvennykh Fitotsenozov), Ashkhabad, 1966 [illegible] Yarschon.

Keywords: [illegible] land, *Agriculture, *USSR, *Deserts, Rural areas [illegible] plants(Botany), Ecology, Economics, [illegible] and development.

This book summarizes experimental work toward establishing perennial winter ranges of shrubs and half-shrubs in the foothill desert. The work deals with the dynamics of the formation of phytocenoses, their life-span, processes of regeneration and competition, and environmental effects. (Author)

TT-70-50038 PC A17/MF A01
National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.
Bird Embryology.
V. V. Rolnik. 1970, 386p* Rept no. (SFCSI-Agr(TT-70-50038)
Trans. of mono. Biologiya Embrionalnogo Razvitiya Ptits, Leningrad, 1968 425p.

Keywords: Birds, Embryology, *USSR, Translations, Embryos, Physiology, Morphology, Development, Eggs, Environments, Effectiveness, Reproduction(Biology), Genetics, *Poultry.

The different aspects of embryo development in birds are of great interest to research biologists. The bird embryo, especially the chick, is a favorite subject of study for morphologists, physiologists, and biochemists and also concerns physicians, poultrymen, and other specialists in applied science. This book deals with the main aspects of biology of embryo development in birds (formation and structure of the egg, morphology and physiology of embryo development) and provides data on the necessary environmental conditions for normal development. The biology of embryo development in poultry is the chief consideration, but to complete the picture, data on the ontogeny of some other bird species are also presented. (Author)

TT-70-50064 PC A12/MF A01
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Selective Breeding of Carp and Intensification of Fish Breeding in Ponds (Selektsiya Karpa i Voprosy Intensifikatsii Prudovogo Rybovodstva).
V. S. Kirpichnikov. 1966, 254p* Rept no. SFCSI-Int(TT-70-50064)
Trans. of Gosudarstvennyi Nauchno-Issledovatelskii Institut Ozernogo i Rechnogo Rybnogo Khozyaistva. Izvestiya (USSR) v61 260p 1966, by E. Hoz, and M. Yariv.

Keywords: *Fishes, Breeding, Carp, Breeding, USSR, Translations, Lakes, Rivers, Fresh water biology, Reproduction(Physiology), *Ponds, Aquaculture, Fisheries.

This volume contains articles on various problems of pond pisciculture. The first section is devoted to the genetics and selection of carp. The primary aim of this collection is to state the theoretic principles of carp selection. Several articles deal with the theory of selective breeding, drawing both on the experience of Soviet scientists and on the comparatively scant non-Soviet literature on this problem. The first part of the collection also includes articles on variability of carp as well as on intraspecific and interspecific hybridization and heterosis. Articles on the organization of fish breeding in the northwestern RSFSR and the section and vindicate the policy of dividing fish breeding farms into three types: research stations, fish breeding nurseries, and commercial fish farms. The second section of this collection consists of articles on intensification of pond pisciculture. Two studies report fish pond diseases and control measures. Konradt and Sakharov report a new commercial method of hatching larvae of carp and other thermophilic fish, involving removal of the egg from its surrounding mucous envelope and incubating it in special apparatus. The method is being tested in reservoir hatcheries and in some fish-breeding farm ponds, and offers much promise. (Author)

TT-70-57149 PC A11/MF A01
National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.
Fundamental Trends in the Evolution of Relations between Employers, Workers and Governments in Africa (Tendances Fondamentales de l'Evolution des Relations entre Employeurs, Travailleurs et Gouvernements en Afrique)
Charles Bokonga. 1971, 232p Rept no. SFCSI-Lab(TT-70-57149)
Contract NSF-C466
Trans. of Annales de droit et de Sciences Politiques (Belgium) n23 186p 1967.

Keywords: Industrial relations, *Africa, *Labor relations, Developing countries, Labor unions, Organizations, Professional personnel, Government policies, Interactions, Management, Personnel, Surveys, France, Translations, Employers, Employees.

A panoramic survey is made of the fundamental tendencies prevailing in the relations between employers, workers, and public authorities in the African countries which have just attained independence. There would appear to be not so much a question of bettering the standard of the working class, a rather privileged class as compared to the entire population, as of bringing officials, political leaders and some entrepreneurs, to preoccupy themselves with the masses. The role of the trade unions is not reduced in this new context. (Author)

TT-70-57224 PC A15/MF A01
Forest Service, Washington, DC.
Interaction of Wood Species in Different Types of Forests
D. D. Lavrinenko. 1972, 339p
Trans. of mono. Vzyamodeistvie Drevesnykh Porod v Razlichnykh Tipakh Lesa, Moscow, 1965. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Forestry, Forest land, Forest trees, *Wood, Cultivation, Economic development, Rotation, Plant growth, Interactions, Soil properties, Mixtures, Acclimatization, Plant genetics, Management, Pine trees, Oak trees, Hardwoods, Translations, USSR, Topology, Handbooks, Silviculture, Forest management, Forest plantations.

The book incorporates theoretical principles of the interaction of wood species in different types of forests and makes recommendations on cultivating high productive plantations of economically important species. The following aspects have been dealt with in this work: studies on the interaction of wood species, trials in forest-steppes for developing stable plantations, typological investigations, aspects of rotation of species, and the problems of intraspecies and interspecies relationships. The author examines the relation of wood species with the environmental conditions, especially with the soil conditions, establishes the competitional indices of wood plants and proves the advantage of mixed plantations over pure plantations. The author also deals with the methods of investigation and the ways of controlling the interactions of the wood species.

TT-71-50100 PC A14/MF A01
Department of Agriculture, Washington, DC.
Handbook of Selection and Seed Growing of Oil Plants
V. S. Pustovoit. 1973, 310p
Trans. of mono. Rukovodstvo po Selektsii i Semenovodstvu Maslichnykh Kultur, Moscow, 1967 352p, by N. Kaner. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Soybeans, *Peanuts, *Sunflower, *Seeds, Selection, Oilseed crops, Economic factors, Volume, Vegetable crops, *Vegetable oils, Soybean plants, Peanut plants, Flax plants, Castor oil, Germination, Pollen, Hybridization, Productivity, Genetics, Translations, USSR, Handbooks, Castor bean plants, Sunflower plants, Sesame plants, Mustard plants.

Experimental material from the All-Union Research Institute of Oil Crops correlated in this book with data obtained from selection stations and leading farms contributes to the understanding of the theoretical and practical aspects of the selection of vegetable oil plants such as sunflower, flax, castor bean, soybean, mustard, peanut, and sesame. The authors analyze the economic significance of the crops, describe the botanical and biological properties of the plants, and present methods for the development of initial stock, the selection and evaluation of plants, and selection techniques. Strain changing, strain renewal, and the processing of experimental data are discussed. The book contains 150 tables, 17 figures, and 47 bibliographical references. (Author)

TT-71-56014 PC A13/MF A01
National Oceanic and Atmospheric Administration, Rockville, MD.
Earthquake Resistant Construction
S. V. Polyakov. 1973, 281p
Trans. of Seismostoikie Konstruktsii Zdanii, Moscow, 1969 326p, by Charles Braver.

Keywords: *Earthquake engineering, Earthquake resistant structures, Research, Dynamic structural analysis, Stresses, Vibration, Degrees of freedom, *Buildings, Loads(Forces), Walls, Correlation techniques, Structural design, Seismic detection, Translations, *USSR.

Contents:
- Some propositions of structural dynamics;
- Some general observations on earthquakes and their action on buildings;
- Determination of seismic forces;
- Classification of building construction schemes--Calculation of horizontal seismic force distribution;
- Constructions of earthquake resistant buildings.

TT-72-50020 PC A03/MF A01
National Marine Fisheries Service, Washington, DC.
Shark Flesh in the Food Industry
V. S. Gordievskaya. 1973, 31p
Trans. of mono. Pishchevoe Ispolzovanie Myasa Tikhookeanskikh Akul, Vladivostok, 1971 37p, by H. Mills. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Food products, *Fishes, Sharks, Utilization, Food industry, Food processing, Meat, Nutritive value, Translations, *USSR.

Contents:
- Size-weight and technochemical characteristics of sharks;
- Food value of shark meat, and removal of urea;
- Utilization of shark meat;
- Preserved products;
- Cured and smoked products;
- Sausages;
- The fins;
- Bibliography.

TT-72-50055 PC A08/MF A01
National Marine Fisheries Service, Washington, DC.
Mass Cultivation of Invertebrates: Biology and Methods
I. V. Ivleva. 1973, 154p*
Trans. of mono. Biologicheskie Osnovy i Metody Massovogo Kultivirovaniya Kormovykh Bespozvonochnykh, Moscow, 1969 171p, by A. Mercado. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: Invertebrates, Cultures(Biology), *Fishes, Feeding stuffs, Morphology, Microorganisms, Nematoda, Crustacea, Daphnia, Larvae, Growth, Distribution(Property), Translations, *USSR.

The monograph deals with the biology and cultivation of some invertebrate species which are reared on a mass scale in the USSR: soil oligochetes; free-living nematodes; phyllopod crustaceans; daphniids; chironomid larvae. The author characterizes the biology of these species more or less uniformly, and gives a brief outline of the gross morphology. Also discussed are the following topics: distribution and relation to environmental factors; reproduction, growth, and development; population growth; feeding; chemical composition of the body; respiration. The description of culturing methods includes such basic standard data as the initial and peak density of the culture, rearing periods, the maintenance of optimal conditions, manipulations of the culture, feeds and feeding regime, and output. Methods for the maintenance of these animal groups in the laboratory are given in some cases. The book is intended for hydrobiologists, ichthyologists, and fish breeders. (Modified author abstract)

TT-72-50070 PC **A11**/MF **A01**
Bureau of Sport Fisheries and Wildlife, Washington, DC.
Diseases of Pond Fishes
O. N. Bauer, V. A. Musselius, and Yu. A. Strelkov.
1973, 228p
Trans. of mono. Bolezni Prudovykh Ryb, Moscow, 1969 335p, by A. Mercado. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Fishes, *Animal diseases, Fresh water fishes, *Ponds, Pathology, Carp, Trout, Parasitic diseases, Infectious diseases, Aquaculture, *USSR, Translations.

The book deals with the important infectious, parasitic and noncommunicable diseases of pond fishes. It presents new concepts of the prevention and treatment of diseases by modern means within the framework of the intensive fish breeding methods used today. The book deals not only with diseases of fish commonly occurring in the USSR, carp and trout, but also with diseases of fish imported for cultivation in ponds. Particular attention is given to the etiology, biology and epizootology of the disease agents, since knowledge in these fields is necessary for the development of efficient methods for the control of the diseases of fish. The book is intended for veterinarians, fish pathologists and fish breeders. (Author)

TT-73-54014 PC **A19**
Department of Agriculture, Washington, DC.
The Structure of Yarn
Witold Zurek. 1975, 430p
Trans. of mono. Struktura Przedzy, Warsaw, 1971 436p, by Michal Zaorski. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Textile industry, *Yarns, Books, Microstructure, Physical properties, Numerical analysis, *Fibers, Textile processes, Spinning, Cotton fibers, Silk, Rayon, Synthetic fibers, Translations, *Poland.

The book contains physical (A) and mathematical (B) tables. Tables of the A group (physical) are meant to help designers at the selection of fibers for an intended end use. After some conclusions have been drawn with regard to the magnitude of particular characteristics (strength, or elongation of yarn), final calculations are made with the use of data referring to definite materials. Tables of the B group (mathematical) allow to determine quickly and accurately the auxiliary values (twist factor, C,D as well as z parameter necessary for calculation of strength), which are used at an appraisal of physical properties of yarn.

TT-74-58086 PC **X00**/MF **A01**
Methods of Direct Conversion of Thermal Energy into Electrical Energy.
1975, 107p
Translation of Sektsiya C-6 of Doklady Vsesoyuznoi Konferensii po Ispolvzovaniyu Solnetsnoi Energii, Erevan, 17--21 June 1969, Moscow, 1969.

Keywords: *Solar energy, Meetings, Buildings, Greenhouses, Solar air conditioning, Solar energy conversion, Solar space heating, Solar water heaters, *Solar cooling systems, *Solar heating systems, *Solar thermal power plants, *Photovoltaic power system, Translations, *USSR.

Articles are presented that deal with conversion of solar energy into electrical energy, solar heating and cooling of buildings, solar water heating, and application of solar energy in greenhouses. (Portions of this document are not fully legible).

TT-75-53043 PC **A99**/MF **A01**
Agricultural Research Service, Washington, DC.
Protecting Plants. Volume I
L. L. Belashev. 1975, 763p
Trans. from Zashchita Rastenii, Moscow (USSR) v1 1972. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Keywords: *Plant diseases, *Pesticides, Toxicity, *Plants(Botany), Herbicides, Spraying, Insecticides, Plant genetics, Tolerances(Physiology), Wheat plants, Antibiotics, Translations, *USSR.

Contents: Genetics of the agricultural crops resistance to virus; Wild species of plants, resistant to diseases and pests; Selection of wheat for resistance to the rust; Antibiotics in the control of plant diseases; Application of herbicides in beet crops; Extra-low volume insecticide spraying; Actual questions of toxicological study of pesticides.

UCID-17006 PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Flat-Plate Solar Collector Handbook: A Survey of Principles, Technical Data and Evaluation Results
H. W. Newkirk. 29 Mar 76, 96p*
Contract W-7405-Eng-48

Keywords: *Solar heating systems, *Solar cooling systems, *Solar collectors, Flat plate collectors, Performance testing, Solar air conditioning, Solar space heating, Solar water heaters, *Solar water heating, Handbooks.

This report begins with a discussion of flat plate solar collector principles. Evaluation data are presented for thirteen manufacturers of medium temperature collectors that have met the criteria: (a) intention by the manufacturer that the equipment be used only for heating and cooling buildings and for domestic hot water heating and (b) evaluation of the collector by NASA using a solar simulator as a basis for collector selection and performance prediction. (ERA citation 01:015909)

UCID-17595 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Two-Week Training Program for Building Solar Thermosiphon Domestic Water-Heating Systems
S. Upton, and J. Costa. 31 Aug 77, 73p
Contract W-7405-ENG-48

Keywords: Solar water heaters, Manuals, Brazing, Construction, Education, Educational tools, Lectures, Maintenance, Pipes, Pumps, Size, *Solar collectors, *Solar water heating, Soldering, Testing, Thermosyphon effect, Specialized training.

Lecture outlines and handouts are presented for a two-week course on building a solar thermosiphon system for home water heating. The course covers solar-energy theory but focuses on practical skills required to build such a system: brazing, soldering, carpentry, sizing pipes, selecting pumps, sizing collectors, and determining domestic hot-water needs. This course is based on one taught at San Jose City College, August 8-19, 1977, for the CAL/NEVA Community Action Agency weatherization crews. (ERA citation 03:039786)

UCID-18772 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Small Hydroelectric Power Development in China
F. R. Skidmore. Aug 80, 18p
Contract W-7405-ENG-48

Keywords: *China, Low-head hydroelectric power plants, Cost, Power generation, Reliability, *Hydroelectric power, Reviews, *Technology assessment.

The small hydroelectric development in China is extensive, with more than 90,000 units, but represents a very small resource in terms of total electricity generation (or as little as 4%). In the rural areas, however, small hydro is an important tool for modernization and represents a substantial percentage (30%) of the electricity. Its characteristics - simplicity, reliability, and low cost are ideal for isolated underdeveloped areas. Good turbine design is largely an empirical science. The Chinese experience in developing technology for for a large variety of operating conditions has provided an empirical basis for good designs. Their small turbines and accompanying control mechanisms thus appear to be competitive in the American market. It is not obvious that other technology, especially on the electrical side, has advantages for the American market. It appears that the Chinese emphasis on small hydroelectric development, in parallel with large central development, will continue in the future. Technical development, especially in the small standardized turbine area, should continue as well. (ERA citation 05:034624)

UCLA-12-1123 PC **A02**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Challenge of a Desert: Revegetation of Disturbed Desert Lands
A. Wallace, E. M. Romney, and R. B. Hunter. 1977, 23p Rept no. CONF-770369-1
Contract EY-76-C-03-0012
NAEG Pu program report meeting, Las Vegas, Nevada, USA, 2 Mar 1977.

Keywords: *Plants(Botany), *Deserts, Revegetation, *Arid land, Biological adaptation, Climates, Economics, Genetic variability, Germination, Moisture, Plant growth, Plants, Productivity, Seeds, Terrestrial ecosystems, Shrubs, Irrigation, Trees(Plants), Grasses.

The revegetation of disturbed, arid lands is one of the great challenges of a desert. It is not an impossible task, however, if one utilizes and properly manages both the natural and the man-made resources available. Through better understanding of the processes governing revegetation and the ability to control them, it is possible for man to more rapidly restore disturbed desert lands. Terrain manipulation to form moisture catchment basins, selection of seed from pioneering shrub species, preservation of existing shrub clump fertile islands in the soil, supplemental fertilization and irrigation, and transplanting vigorous shrub species are some of the important things that can be done to help restore disturbed desert land. Some of the costs can be off-set by restoring the land to economically important trees and shrubs, or grasses, instead of back to the original vegetation. Thousands of years of historical evidence of man's survival on arid lands attest to success in meeting the challenge of the desert. (41 references). (ERA citation 03:001379)

UCLA-12/1279 PC **A09**/MF **A01**
California Univ., Los Angeles. Lab. of Biomedical and Environmental Sciences.
Community Applications of Small-Scale Solar-Thermal Energy Systems
J. H. Baldwin, C. Steinberg, and D. Stea. Feb 81, 177p
Contract AC03-76SF00012

Keywords: Communities, *Solar thermal power plants, Aesthetics, Agriculture, Air quality, Attitudes, *Community development, Building codes, Commercial sector, Demonstration programs, Environmental impacts, Evaluation, Financial incentives, Financing, Industry, Legal aspects, Legislation, Market, National government, Power range 1-10 mw, Power range 100-1000 kw, Public opinion, Public utilities, Regulations, Residential sector, Safety, Social impact, Socio-economic factors, Solar access, Solar process heat, State government, Taxes, Total energy systems, Urban areas, Uses, Water quality, Zoning.

Rapid technological development of small scale solar thermal energy systems (STES) may bring them on line before communities are adequately prepared for them. Information for analyzing and siting STES is presented along with discussions of community applications, regulations, impacts and incentives. By providing this information to community planners, it is hoped that barriers to STES utilization can be anticipated and mitigated. (ERA citation 06:018323)

UCRL-Trans-11076 PC **A03**/MF **A01**
Methanol as an Energy Source and Its Synthesis
T. Yamamoto. 1975, 27p
Translated from Koatsu Gasu 12 n4 p141-145 1975.

Keywords: *Methanol, *Automotive fuels, Boiler fuel, Hydrogen production, Single cell protein, Synthesis, Town gas, Uses, Translations, Japan, *Fuels, Production.

The processes used for the production of methanol from naphtha, natural gas, heavy petroleum, or liquefied natural gases are summarized. The use of methanol as an energy source is considered from six aspects: as a hydrogen source, as a source of city gas, for the production of reductive gas for the steel industry, as an automotive fuel, as a fuel for streaming contact combustion in boilers, and as a source of single cell protein. The use of nuclear energy for the production of methanol is briefly considered. (ERA citation 01:023013)

UCRL-52385(Rev.1) PC A04/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Design Guide for Shallow Solar Ponds
A. B. Casamajor, and R. E. Parsons. 8 Jan 79, 65p
Contract W-7405-ENG-48

Keywords: *Solar ponds, Butenes, Cost, Design, Diagrams, Films, Operation, Performance, Polyethylenes, PVC, Size, Specifications.

The Solar Energy Group at LLL has developed shallow solar ponds to supply solarheated water for industrial and commercial use at a cost that is competitive with conventional energy sources. Three aspects of this SSP technology are discussed: (1) an introduction to SSP technology, potential, and limitations; (2) a detailed description of the design and operation of an SSP system including component drawings and specifications; and (3) planning information so that an SSP system can be sized for a particular applicaion and the cost can be estimated. (ERA citation 04:029707)

UCRL-52397 PC A03/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Engineering Feasibility of a 150-KW Irrigation Pumping Plant Using Shallow Solar Ponds
E. A. Platt, and R. L. Wood. 3 Apr 78, 26p
Contract W-7405-ENG-48

Keywords: *Irrigation, *Solar ponds, Solar water pumps, California, Cost, Economics, Engineering, Feasibility studies, Freons, Installation, Rankine cycle engines, Refrigerants, Solar collectors, Weather, Working fluids, *Water pumps.

The economics was analyzed of a field of shallow solar ponds that presumably supplies the heat for a Rankine cycle engine using refrigerant R-113 for the working fluid. When operating, the engine supplies 150 kW of shaft power, 125 kW of that is available for deep-well irrigation pumping. The system components have been chosen to produce the maximum net energy--April through October--per dollar of installation cost. Weather data are from Inyokern, California, 1962 records for most calculations. It was estimated that, for a private investor, the real internal rate of return for this installation would be positive only if in the forseeable future the cost of conventional energy were to inflate 8% faster than the cost of the commodities needed by the solar system. A 17% differential inflation rate would produce a 10% rate of return. Reduction in cost of the shallow solar ponds potentially could reduce the system installation cost by about 20%. (ERA citation 03:042543)

UCRL-79515 PC A02/MF A01
California Univ., Livermore. Lawrence Livermore Lab.
Early Impact of Solar Energy Through Industrial Applications
R. C. Maninger. 23 Jun 77, 16p Rept no. CONF-770707-1
Contract W-7405-ENG-48
Western plant engineering conference and show, Anaheim, California, United States of America (USA), 13 Jul 1977.

Keywords: *Solar energy, Commercialization, Information, Technology transfer, Research management.

The Energy Research and Development Administration (ERDA) has established a Solar Technology Transfer Program (STTP) as an important part of the ERDA mission to promote rapid and widespread commercialization of solar energy. This program is an innovative approach to technology transfer through information dissemination and training in solar energy. This is done by means of an integrated network of regional technology agents who interact directly with multiplier groups in both the public and private sectors. Details of the program and ways of industrial participation in it are described. (ERA citation 02:051156)

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DSE/1217-1

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Plant Requirements for Manufacture of Refrigerated Walk-In Coolers
PB-292 821/6
Plant Requirements for Manufacture of Manganese
PB-292 823/2
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(NOAA-76111019)
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WHOI-77-59
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PB-275 180/8
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PB-245 004/7

INDUSTRY PROFILES AND INDUSTRIAL PLANT REPORTS

INDUSTRY PROFILES

In 1966 and 1967, the United States Agency for International Development's Industry Profiles Program published a series of professional analyses to promote the growth of industry in developing countries. Each analysis presented preliminary information on one specific type of small or medium-sized industrial plant. These 4-8 page profiles deal with the industry's marketing problems, approximate amount of capital needed to establish a plant of specified capacity, and the estimated annual costs, by categories, of running the plant at full capacity. A sample follows.

Users of these profiles are reminded that the cost figures were calculated on the basis of United States operating expenses during the late 1960's, so the figures are generally out-of-date. In addition prices and conditions vary greatly in differing countries. The profiles may, nevertheless, still be applicable to situations in certain countries but will need to be adapted to local conditions, including availability of materials, government restrictions, labor costs, etc.

The profiles provide workflow diagrams and plant layouts, as well as supplementary reference information on technical journals, articles, books, patents and professional services. It should again be considered that this information is from the 1960's and improvements may have been made in structural elements and processes.

The profiles can be quite beneficial for potential entrepreneurs who need a general idea on what are the initial steps involved in starting-up a new industry. It should be remembered that the profiles are *not* a substitute for specific studies, whether simple or elaborate, that would precede the actual establishment of new plants. What these profiles do is help the planner decide whether or not to continue working on a specific project.

INDUSTRIAL PLANTS REPORTS

While industry profiles give a brief description of an industry, the industrial plant reports are detailed and *were prepared to answer overseas technical inquiries on factory operations, management, and engineering. Most reports include information and cost estimates on labor, machinery, equipment and supplies, markets, sales and financial and economic factors.* However, these reports are designed to provide only a general picture of the factors that must be considered in establishing and operating a factory. In most cases, plans for actual installation will require expert engineering and financial advice in order to meet specific local conditions.

SOME ADVICE

Before an investment is made in a plant, a feasibility study should be conducted. This may require skilled economic and engineering experience. Some questions that must be answered but which are not covered in these profiles are:

1) What is the present demand for the product, and how is it now being satisfied?

2) Will the market absorb the production of the new plant?

3) Will the estimated sales prices and quality of the product make it competitive?

4) How will the plant be financed?

5) What is the marketing and distribution plan and to whom will the product be sold?

6) How can a realistic time schedule be developed for: supplies, training personnel, and start-up time for the plant?

7) Have arrangements been made to obtain needed materials and supplies?

8) Are trained personnel available?

9) Do adequate transportation, storage, power, communications, fuel, water, and other facilities exist?

10) Has a sound plan for equipment, design, construction, and operations been developed?

11) Have proper management controls for design, production, quality-control, and other factors been developed?

12) Will the industry fit into the development plans for the area?

13) Will the industry be environmentally sound?

14) Most important of all, will the industry contribute to the local quality of life?

ORDERING INFORMATION FOR INDUSTRY PROFILES

NTIS has 400 Industry Profiles and numerous industrial plant reports. They are listed by subject in alphabetical order beginning on the following pages. The price for each individual Industry Profile is $6.00 if you live in North America (Mexico, Canada, USA) or have a USAID mission assisting your country. The price is $12 in all other countries. The Plant Reports priced individually. See ordering information to find the price code for them.

Complete sets of the 250 Industry Profiles published in 1966, AID-IP-66001 through AID-IP-66250 consecutively, cost $75 per set in North American and USAID countries or $150 in other countries. The order number is AID-OP-66-ALL

Complete sets of the 150 Industry Profiles published in 1967, AID-IP-67251 through AID-IP-67400 consecutively may be purchased for $45 per set by North American or USAID countries or $90 per set in other countries. The order number is AID-IP-67-ALL

After selecting the profiles in the subject areas of interest, find the order number directly to the right of the subject listing (example AID-IP-66020). The order may be placed using the form in the back, or through the local NTIS cooperating organization (see inside back cover).

SAMPLE INDUSTRY PROFILE

INDUSTRY PROFILES

POULTRY FARM (EGG PRODUCTION)

I.P. NO. 67259
S.I.C. 0133

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scall plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country. This profile should help in reaching correct assumptions.

POULTRY FARM (EGG PRODUCTION)

PRODUCT DESCRIPTION

Poultry farm devoted to the production of eggs. Hens are sold for meat only after they have passed their peak of egg production.

A. GENERAL EVALUATION OF PROSPECTS

There are so many large poultry farms in the United States that a farm of the capacity described in this profile could not be operated in the U.S. at a profit. There are almost no small poultry farms operating in the United States at present and virtually none as small as the farm described here. Many countries endeavoring to develop industry have done very little about the poultry industry. There is a definite need for breed improvement and greater egg production in countries where the hens and eggs are small. While this profile is intended for use in countries other than the United States, the cost of building, equipment, materials and labor are based on average costs in the U.S. at the present time. The sales values given in this profile are higher than those presently prevailing in the U.S. because egg prices today are lower than they have been in many years. A plant of the size indicated in this profile would be a profitable investment in many countries and would be a means of upgrading the existing poultry stock. When the laying hens have passed their production peak, they are sold. Funds received from the sale of hens will provide feed for the new chicks until they reach laying age. For culling purposes, 10% extra, or 1,100 chicks, are purchased to provide 1,000 good laying hens.

B. MARKET ASPECTS

1. USERS

Bakeries, restaurants, private homes for food consumption.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are made direct to consumers. The domestic market should comprise a radius of 15 miles. The size and quality of eggs produced should eliminate domestic competition. This plant will produce about 700 eggs per day and a relatively small population, close to the poultry farm, should consume the plant's entire output. This farm is too small to consider exporting any part of the plant's production. No competition from imported products should be experienced.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture, in the United States, of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial product costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $14,000.
The total fixed investment, plus working capital, is estimated at $17,000.
The annual gross profit, before taxes, is estimated at $1,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 7.1%.
(A gross profit on sales, before taxes, of 7.1%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 5.8%.

5. COST PER MAN EMPLOYED

One direct and one indirect worker, or a total of two workers, are employed
The total fixed capital investment is estimated at $14,800.
Based on these figures, the investment per man employed would amount to $7,400.

C. PRODUCTION REQUIREMENTS - POULTRY FARM (EGG PRODUCTION)
ANNUAL CAPACITY - 1,000 LAYERS: 22,000 DOZEN EGGS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS	COST
a. FIXED CAPITAL	
Land - one acre	
Building - 40' x 60'	
Equipment, furniture and equipment	
Production tools and equipment	
Other tools and equipment	
Furniture & Fixtures	
Transportation equipment	
-Total fixed capital	$14,800
Principal Items:	
14 High stand feeders 8' long	
4 Grit and oyster shell boxes	
4 Automatic water units 8' long	
20 10-hole metal nests	
1 Time clock	
2 Egg baskets	
1 Egg inspection equipment	
b. WORKING CAPITAL (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discount bad debts & allowances	
Sales revenue	
Training costs	
-Total working capital	$ 2,300
c. TOTAL CAPITAL REQUIREMENTS	$17,100

2. MATERIALS AND SUPPLIES - Annual	COST
a. DIRECT MATERIALS	
Chicks (1,100 required)	
Feed (40 tons required)	
Grit and oyster shells	
Chemicals, medicinals and insecticides	
Egg cartons	
-Total direct materials	$ 4,900
b. SUPPLIES	
Lubricants & hand tools	
Cutting tools and abrasives	
Maintenance and spare parts	
Office supplies	
Gas, oil and maintenance of truck	
-Total supplies	$ 500
c. AVAILABILITY OF MATERIALS & SUPPLIES	
All available locally except chicks	

3. POWER, FUEL AND WATER	ANNUAL COST
Electric Power - lights	
Fuel - none required	
Water - must be potable	$ 290

4. DEPRECIATION - Years Life	
Building (20 yrs)	
Production tools and equipment (10 yrs)	
Other tools and equipment (10 yrs)	
Furniture & fixtures (10 yrs)	
Transportation (4 yrs)	
-Total depreciation	$ 1,410

5. MANPOWER	
a. INDIRECT LABOR	
Owner (1)	
-Total indirect labor(1)	$ 4,000
b. DIRECT LABOR	
Skilled workers (0)	
Semi-skilled workers(0)	
Unskilled workers(part-time)(1)	
-Total direct labor(1)	$ 400
c. TRAINING NEEDS	
Owners will train the part-time workers to assist in cleaning the building. Owner will drive the delivery truck or will train part-time worker.	

6. TRANSPORTATION	
a. OWN TRANSPORT EQUIPMENT	
Truck	
b. EXTERNAL TRANSPORT FACILITIES	
None required	
Good highways	

7. TOTAL ANNUAL COSTS AND SALES REVENUE		
Direct materials	$4,900	
Direct labor	$ 400	
Manufacturing overhead*	$6,200	
-Total manufacturing costs		$11,500
Interest on leans		
Insurance		
Legal		
Audit		
Contingencies		
-Total administrative cost		$ 1,100
Sales expense		0
Freight-out, travel discounts		
Allowances & bad debts		400
-Total annual costs		$13,000
ANNUAL GROSS PROFIT		$ 1,000
ANNUAL SALES REVENUE		$14,000

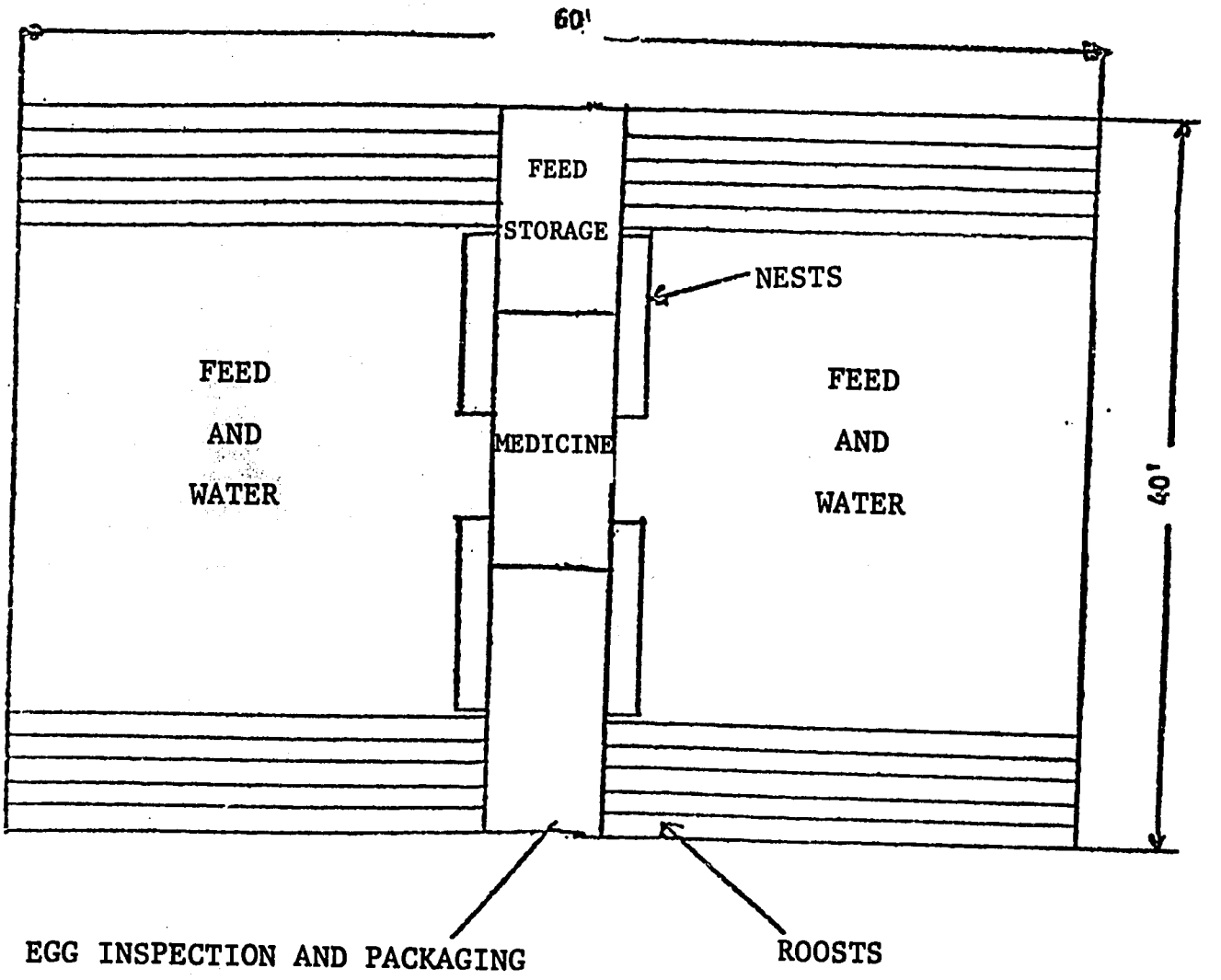
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a).
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

I.P. NO. 67259
S.I.C. 0133

POULTRY FARM (EGG PRODUCTION)

PLANT LAYOUT

LAYERS



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POULTRY FARM (EGG PRODUCTION)

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I. TECHNICAL AND TRADE BOOKS

A. Marketing Poultry Products. E.W. Benjamin and others. 5th Edition. 1960. 327 pp. Illus. $7.95

John Wiley & Sons, Inc.
605 Third Avenue
New York, New York 10016

B. Poultry Production. C.E. Bundy and R.V. Diggins. 1960. 370 pp. $8.04 (Deals with the operation of poultry farming.)

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

C. Farm Poultry Management. Sept. 1966. $.15. Farmers' Bulletin No. 2197. U.S. Department of Agriculture.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

II. TECHNICAL AND TRADE PERIODICALS

A. Everybody's Poultry Magazine. Monthly. $.50/year. (Deals exclusively with the poultry industry.)

Everybody's Poultry Magazine Publishing Company
Hanover, Pennsylvania 17331

B. Poultry and Eggs. Weekly Newspaper. $2.00/year. (Deals exclusively with the poultry industry.)

Packer Publishing Company
201 Delaware Street
Kansas City, Missouri 64105

III. BUSINESS MANAGEMENT MATERIALS

A. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series. (Seventh Edition, Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.)

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

B. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00 (Insights and clues concerning the entire process of small business formations, growth, and decline.)

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D.C. 20231. $.50 each.

A. Patent No. 3,148,649. Methods of Treating Eggs.
September 1964. 6 pp.

B. Patent No. 3,123,045. Vacuum Process for Treating Hatching Eggs.
March 1964. 4 pp.

C. Patent No. 3,120,834. Method of Introducing Adjuvants into Avian Egg Interiors.
February 1964. 4 pp.

D. Patent No. 3,123,044. Apparatus for Recording Poultry Egg Production.
March 1964. 5 pp.

E. Patent No. 3,071,110. Animal Actuated Poultry Nest Appliance.
January 1963. 3 pp.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. American Poultry and Hatchery Association
521 East 63rd Street
Kansas City, Missouri 64110

B. Poultry Breeders of America
521 East 63rd Street
Kansas City, Missouri 64110

VI. DIRECTORIES

A. Who's Who in the Egg and Poultry Industry. Annual. $15.00

Watt Publishing Company
Sandstone Building
Mount Morris, Illinois 61054

Firms manufacturing poultry equipment and supplies, egg and poultry processors, wholesalers, jobbers, brokers, exporters, Federal agencies, associations.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of a private professional engineer are not likely to be needed to establish a poultry farm since the equipment needed to operate an egg production plant can usually be obtained, on lease, from the manufacturer. Manufacturers of equipment employ specialists familiar with the design and installation of their specialized products. These manufacturers usually give prospective customers the benefit of technical advice by their engineers or specialists in determining the suitability of their equipment for the enterprise in question.

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APPAREL AND OTHER FINISHED PRODUCTS MADE FROM FABRIC AND SIMILAR MATERIALS	
Industry Profiles	
Men's Dress Shirts	AID-IP-66023
Work Gloves	AID-IP-66024
Men's Underwear	AID-IP-66025
Cotton Dresses	AID-IP-66037
Men's Work Pants	AID-IP-66052
Men's Work Shirts	AID-IP-66062
Cloth Bags for Agricultural Products	AID-IP-66155
Bathrobes	AID-IP-67265
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Men's and Youths Suits	AID-IP-67348
Men's Sport Shirt	AID-IP-67362
Women's and Misses' Suits	AID-IP-67369
Slips, Women's, Misses' & Children's	AID-IP-67378
Women's and Misses' Cotton Gingham Dresses	AID-IP-67397
Nurses' Washable Service Apparel	AID-IP-67398
Industrial Plants	
Plant Requirements for Manufacture of Cotton Dresses	PB-175539/6
Men's Work Shirts, Capital Requirements, Techniques and Operations	PB-177915/6
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Industry Profiles	
Tire Recapping	AID-IP-66173
Industrial Plants	
Nondestructive Testing System for Retreads	PB-247083/9
CHEMICALS AND ALLIED PRODUCTS	
Industry Profiles	
Synthetic Detergent	AID-IP-66002
Caustic Soda	AID-IP-66050
Insecticides	AID-IP-66057
Fertilizer Mixing	AID-IP-66066
Castor Oil Hydrogenated	AID-IP-66104
Dry Ice	AID-IP-66107
Laundry and Milled Toilet Soap	AID-IP-66110
Oil of Cloves	AID-IP-66113
Paint	AID-IP-66114
Pharmaceutical Tablets and Pills	AID-IP-66116
Salicylic Acid	AID-IP-66119
Sea Salt	AID-IP-66120
Superphosphate and Diammonium	AID-IP-66123
Tanning Extracts	AID-IP-66124
Superphosphates	AID-IP-66149
Lemon Oil	AID-IP-66218
Saccharin	AID-IP-66222
Carbide	AID-IP-66233
Sulfuric Acid	AID-IP-66234
Oxygen and Acetylene Bottled	AID-IP-67287
Industrial Plants	
Energy Conservation: A Route to Improved Distillation Profitability. Executive Briefing Report, Technology Transfer	DOE/CS/4431-T1
Design Report: Small-Scale Fuel Alcohol Plant	IDO-10088 (V.1)
Design Report: Small-Scale fuel Alcohol Plant	IDO-10088 (V.2)

Subject & Title	Order Number
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Technical-Economical Study on the Production of Lime in Honduras (Text in Spanish)	PB-296721/4
Industrias Quimica S.A. A Proposed Plant to Produce Sulphuric Acid in Panama	PB-298643/8
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Lime Burning and Alkaline Pulping	PB-298838/4
Desalting Handbook for Planners (Second Edition)	PB80-202518

COMMERCIAL FARMS

Industry Profiles

Poultry Farm	AID-IP-67259
Poultry Farm (Broiler Production)	AID-IP-67374

Industrial Plants

Technical Report on the Integral Industrialization of the Pseudo-Stem of Banana Trees (Text in Spanish)	PB80-171002

CRUDE PETROLEUM AND NATURAL GAS

Industry Profiles

Liquefied Petroleum Gas (Manufactured)	AID-IP-67324

ELECTRIC, GAS AND SANITARY SERVICES

Industry Profiles

Small Community Electric System	AID-IP-66171

Industrial Plants

Plant Requirements to Set Up and Operate a Small Community Electric System	PB-292664/0

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES

Industry Profiles

Automobile Batteries	AID-IP-66152
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Refrigerated Walk-in Coolers	AID-IP-66168
Electric Fans, 12-Inch Oscillating	AID-IP-66182
Electric Space Heaters	AID-IP-66183
Air Conditioners and Refrigerators	AID-IP-66201
Cold Storage for Meat and Poultry	AID-IP-66208
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Electrodes for Neon Lights	AID-IP-66212
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Radio Receiving Sets	AID-IP-67274
Electric Outlet, Switch and Fuse Boxes	AID-IP-67290
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Washing Machines, Household	AID-IP-67322
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Light Bulb Assembly Plant	AID-IP-67399

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Plant Requirements for Manufacture of Brass Table Lamps	PB-292959/4

FABRICATED METAL PRODUCTS, EXCEPT ORDNANCE, MACHINERY AND TRANSPORTATION EQUIPMENT

Industry Profiles

Building Hardware	AID-IP-66102

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Buckets, Pails and Pans	AID-IP-66103
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Primary Hardware	AID-IP-66117
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Automobile and Truck Leaf Springs	AID-IP-66131
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Metal Spinning	AID-IP-66137
Ornamental Ironwork	AID-IP-66139
Plating	AID-IP-66141
Sanitary Ware	AID-IP-66144
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Storage Bins	AID-IP-66148
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Plating of Automobile Parts	AID-IP-67284
Wash Tubs and Pails	AID-IP-67296
Grocery Carts	AID-IP-67371
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Plant Requirements to Set Up and Operate a Plant for Plating of Automobile Parts	PB-175547/9
Plant Requirements for Manufacture of Sanitary Ware	PB-177923/0
Plant Requirements for Manufacture of Mechanical Springs	PB-177939/6
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Plant Requirements for Manufacture of Metal Spinning Products	PB-292825/7
Plant Requirements for Manufacture of Stainless Steel Utensils	PB-292828/1
Plant Requirements for Manufacture of Farm Hand Tools	PB-292860/4
Plant Requirements for Manufacture of Two-Burner Gas Plates	PB-292878/6
Plant Requirements for Manufacture of Wire Products	PB-292920/6
Plant Requirements for Manufacture of Aluminum Architectural Specialties	PB-292956/0
Plant Requirements for Manufacture of Aluminum Kitchenware	PB-293011/3

FOOD AND KINDRED PRODUCTS

Subject & Title	Order Number
Industry Profiles	
Carbonated Beverages	AID-IP-66001
Fish Oil and Fish Meal	AID-IP-66007
Fish, Dried and Salted	AID-IP-66008
Unfermented Grape Juice	AID-IP-66009
Biscuits and Crackers	AID-IP-60011
Orange Juice, Chilled, in Waxed Containers	AID-IP-66012
Salted Peanuts	AID-IP-66013
Quick-Frozen Fish	AID-IP-66014
Animal Feed Pellets	AID-IP-66015
Wheat Flour	AID-IP-66026
Rice	AID-IP-66027
Bakery	AID-IP-66028
Raw Sugar	AID-IP-66029
Crushed Ice and Ice Cubes, Packaged	AID-IP-66030
Meat Processing	AID-IP-66058
Slaughtering and Meat Packaging	AID-IP-66059
Smoked Meat	AID-IP-66060
Citrus Fruit—Whole Sections, Canned	AID-IP-66061
Block Ice	AID-IP-66077
Crude Olive Oil	AID-IP-66085
Mayonnaise	AID-IP-66087
Orange Juice, Canned	AID-IP-66090
Orange Juice Concentrate	AID-IP-66091
Vanilla Extract	AID-IP-66095
Potato Flakes	AID-IP-66167
Vegetable Canning (Commercial)	AID-IP-66223
Vegetable Canning (Cooperative)	AID-IP-66224
Canned Beef	AID-IP-66231
Canned Tuna Fish	AID-IP-66232
Dehydrated Blackstrap Molasses	AID-IP-67253
Fig and Date Processing	AID-IP-67261
Castor Oil and Meal	AID-IP-67269
Prawn Processing Plant	AID-IP-67276
Soybean Oil and Meal	AID-IP-67278
Cocoa Butter	AID-IP-67288
Meat Canning Plant	AID-IP-67292
Brewers Flakes	AID-IP-67293
Raisins, Dehydrated Grapes	AID-IP-67294
Walnut Veneer	AID-IP-67295
Canned Fish	AID-IP-67304

Subject & Title	Order Number
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Canned Dehydrated Onions	AID-IP-67312
Glucose From Cassave Starch	AID-IP-67313
Potato Chips	AID-IP-67315
Starch, Oil, and Feed From Sorghum Grain	AID-IP-67317
Fish Oil and Fish Meal Plant—Evaporation Process (20 Tons)	AID-IP-67318
Bottled Milk	AID-IP-67319
Canned Cherries	AID-IP-67326
Canned Asparagus	AID-IP-67327
Canned Beets	AID-IP-67328
Canned Peaches	AID-IP-67329
Canned Hominy	AID-IP-67330
Canned Okra	AID-IP-67331
Canned Sweet Potatoes	AID-IP-67332
Canned Strawberries	AID-IP-67333
Canned Sliced Apples	AID-IP-67334
Canned Blueberries	AID-IP-67335
Canned Apricots	AID-IP-67336
Canned Cream Style Corn	AID-IP-67337
Canned Dry Beans	AID-IP-67338
Canned Spinach	AID-IP-67339
Canned Wax Beans	AID-IP-67340
Canned Blackeyed Peas	AID-IP-67341
Canned Tomatoes	AID-IP-67342
Canned Cream of Celery Soup, Ready to Serve	AID-IP-67343
Canned Cream of Asparagus Soup, Ready to Serve	AID-IP-67344
Bicycle Tires and Innertubes	AID-IP-67350
Canned Cauliflower	AID-IP-67351
Canned Pumpkin	AID-IP-67352
Canned Whole Kernel Corn	AID-IP-67353
Canned Green Beans	AID-IP-67354
Canned Onions	AID-IP-67355
Canned Apple Sauce	AID-IP-67356
Canned Pears	AID-IP-67357
Rice Bran Oil and Bran Meal	AID-IP-67363
Canned Red Raspberries	AID-IP-67364
Canned Tomato Soup, Ready to Serve	AID-IP-67365
Canned Pea Soup, Ready to Serve	AID-IP-67366
Canned Pork and Beans	AID-IP-67367
Candy and Confectionery	AID-IP-67368
Pearl Starch	AID-IP-67375
Chocolate Dipped Products	AID-IP-67376
Fish Oil and Fish Meal Plant—Evaporation Process (40 Tons)	AID-IP-67377
Glazed Fruits and Fruit Peel	AID-IP-67380
Canned Cranberries	AID-IP-67381
Canned Green Peas	AID-IP-67382
Canned Sliced Pineapple	AID-IP-67383
Canned Lima Beans	AID-IP-67384
Assorted Nuts, Processed and Packaged	AID-IP-67385
Canned Squash	AID-IP-67386
Canned Plums	AID-IP-67387
Food Processing, General	AID-IP-67388
Canned Carrots	AID-IP-67389
Canned Kale Greens	AID-IP-67390
Canned Broccoli	AID-IP-67391
Canned Tomato Juice	AID-IP-67392
Canned Bean Soup, Ready to Serve	AID-IP-67393
Canned Cream of Corn Soup, Ready to Serve	AID-IP-67394
Canned Cream of Mushroom Soup, Ready to Serve	AID-IP-67395
Canned Sardines	AID-IP-67396

Industrial Plants

Subject & Title	Order Number
Plant Requirements to Set Up and Operate Small Bread Bakeries	PB-175523/0
Plant Requirements for Manufacture of Candy and Confectionery	PB-175526/3
Plant Requirements for Processing of Dairy Products	PB-175527/1
Plant Requirements for Manufacture of Fruit and Vegetable Juices	PB-175542/0
Plant Requirements to Set Up and Operate a Seafood Processing Plant	PB-175545/3
Plant Requirements to Set Up and Operate a Meat Processing Plant	PB-177926/3
Plant Requirements for Manufacture of Soybean Oil and Meal	PB-177933/9
Mayonnaise	PB-177943/8
Plant Requirements for Manufacture of Milled Rice	PB-186514/6
Decentralized Tomato Processing: Plant Design, Costs, and Economic Feasibility	PB-251382/8
Feasibility of a Beef Processing Plant on the Blackfeet Indian Reservation	PB-264638/8
Small Canning Factories (Text in French)	PB-286444/5
Small Canning Factories	PB-286445/2
Plant Requirements for Processing Potato Chips	PB-292671/5
Plant Requirements for Manufacture of Unfermented Grape Juice	PB-292689/7
Plant Requirements for Manufacture of Dehydrated Molasses	PB-292822/4
Plant Requirements for Manufacture of Block Ice	PB-292826/5

Subject & Title	Order Number
Plant Requirements for Manufacture of Carob Molasses	PB-292923/0
Plant Requirements for Manufacture of Brewers Flakes	PB-293000/6
Plant Requirements for Manufacture of Animal Feed Pellets	PB-293002/2
Plant Requirements for Manufacture of Castor Oil	PB-293003/0
Plant Requirements for Manufacture of Rice Bran Oil	PB-293006/3
Plant Requirements for Manufacture of Raw Sugar	PB-293007/1
Plant Requirements for Manufacture of Fish Meal	PB-293009/7
Design of a Factory for the Productivity of Tomato Paste	PB-294139/1
A Proposed Factory in Honduras for the Processing of Pineapples and Other Tropical Fruits	PB-294234/0
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on November 20-30, 1978. Technology Planning Factors in the Cane Sugar Industry	PB-297239/6
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Appropriate Technology in Production of Cane Sugar	PB-298846/7
International Forum on Appropriate Industrial Technology Held at New Delhi/Anand, India on November 20-30, 1978. Cane Sugar Techniques in Developing Countries	PB-298863/2
Appropriate Technology on Mini-Sugar (Ops Khandsari)	PB80-125693
Processing Maple Syrup with a Vapor Compression Distiller: An Economic Analysis	PB81-139800

FURNITURE AND FIXTURES

Industry Profiles

Subject & Title	Order Number
Baby Beds, Pens, and Bassinets	AID-IP-60010
Bedroom and Dining Room Furniture	AID-IP-66043
Upholstered Occasional Chairs	AID-IP-66044
Foam Rubber and Polyurethane Foam	AID-IP-66045
Metal Filing Cabinets	AID-IP-66046
Folding Chairs	AID-IP-66047
Overstuffed Furniture	AID-IP-66054
Cotton Roll-Edged Mattresses	AID-IP-66083
Kitchen Cabinets	AID-IP-66086
Office Chairs	AID-IP-66089
Reed and Rattan Furniture	AID-IP-66094
Wood Tables and Chairs	AID-IP-66099
Innerspring Mattresses and Box Springs	AID-IP-67254
Bookcases, Corner Cabinets and Secretaries	AID-IP-67258
Wooden Warerobes	AID-IP-67262
Bentwood Chairs	AID-IP-67264
Coffee Tables, End Tables and Bed Stands	AID-IP-67266
Lawn Furniture	AID-IP-67270
Church Furniture	AID-IP-67272
School Furniture	AID-IP-67282
Metal Lockers	AID-IP-67298
Restaurant and Cafeteria Furniture	AID-IP-67360
Venetian Blinds	AID-IP-67361
Rockers, Wood, Upholstered	AID-IP-67400

Industrial Plants

Subject & Title	Order Number
Plant Requirements for Manufacture of Wood Tables and Chairs	PB-177925/5

LEATHER AND LEATHER PRODUCTS

Industry Profiles

Subject & Title	Order Number
Leather Tanning	AID-IP-66072
Men's Dress Shoes	AID-IP-66073
Ladies' Handbags and Leather Specialties	AID-IP-66074
Ladies' Dress Shoes	AID-IP-66109
Men's Work Shoes	AID-IP-66111
Small Leather Tannery	AID-IP-66122
Women's Shoes	AID-IP-66250
Brief Cases, Leather	AID-IP-67275

Industrial Plants

Subject & Title	Order Number
Plant Requirements to Set Up and Operate a Leather Tannery	PB-292803/4
Plant Requirements for Manufacture of Chrome Tanned Leather	PB-292831/5

LUMBER AND WOOD PRODUCTS, EXCEPT FURNITURE

Industry Profiles

Subject & Title	Order Number
Step and Extension Ladders	AID-IP-66020
Cork Products	AID-IP-66021
Sash and Door Plant	AID-IP-66022
Hardwood Parquet Flooring	AID-IP-66038

Subject & Title	Order Number
Flush Doors	AID-IP-66039
Plywood	AID-IP-66040
Particle Board	AID-IP-66041
Wooden Ice Cream Spoons and Sticks	AID-IP-66042
Wooden Shoe Lasts	AID-IP-66053
Planing Mill	AID-IP-66063
Rough Sawing of Logs	AID-IP-66064
Barrels	AID-IP-66065
Beverage Boxes	AID-IP-66076
Boxes and Shooks	AID-IP-66078
Costumers, Lamps and Picture Frames	AID-IP-66082
Crates, Baskets and Hampers	AID-IP-66084
Wood Fiber Souvenirs	AID-IP-66096
Toilet Seats and Lids	AID-IP-67252
Wooden Handles	AID-IP-67289
Walnut Veneer	AID-IP-67295
Portable Sawmill	AID-IP-67307
Creosoted Wood Products	AID-IP-67321
Dimension Hardwood	AID-IP-67325
Industrial Plants	
Is There A "Best" Sawing Method	AD-A035615/4
Individual Log Yields by Eight Sawing Systems	AD-A035636/0
Accelerating the Kiln Drying of Oak	AD-A093075/0
Wood Pallet Manufacturing	AD-736268/4
Planing Mill Dressed or Finished Lumber	PB-175522/2
A Small Sawmill Enterprise	PB-175531/3
Rough Sawing of Logs	PB-175548/7
Wood Wastes	PB-175550/3
Plant Requirements for Manufacture of Flush Doors	PB-177929/7
Plant Requirements for Manufacture of Plywood	PB-177930/5
A Small Particle Board Plant	PB-177944/6
Kiln Drying of Western Canadian Lumber	PB-266126/2
Sash and Door Plant: A Reference For Use in Planning New Industrial Facilities	PB-292784/6
Plant Requirements for Manufacture of Boxes and Shooks	PB-292922/2
Determining Fixed and Operating Costs of Logging Equipment	PB80-202450
Technology Utilization in Rural Development	PB81-204174

MACHINERY, EXCEPT ELECTRICAL

Subject & Title	Order Number
Industry Profiles	
Agricultural Implements	AID-IP-66127
Plows	AID-IP-66142
Rice Paddy Cultivators	AID-IP-66143
Job Machine Shop	AID-IP-66162
Shallow Well Hand Pumps	AID-IP-66169
Water Filters, Domestic	AID-IP-66200
Conveyors and Portable Elevators	AID-IP-66209
Centrifugal Blowers	AID-IP-66216
Pumps, Small Hand and Power Driven	AID-IP-66221
Compressors, ¼ Horsepower Sealed Unit	AID-IP-66235
Industrial Hand Trucks and Skids	AID-IP-67256
10-Horsepower Utility Riding Tractors	AID-IP-67299
Power Lawn Mower	AID-IP-67300
Foundry Pattern Making	AID-IP-67309
Jigs and Fixtures	AID-IP-67310
Industrial Plants	
Plant Requirements to Set Up and Operate a Job Machine Shop	PB-175541/2
Replacement of Inefficient Boilers by Modern Package Boilers for Fuel Economy	PB80-197882

MISCELLANEOUS MANUFACTURING INDUSTRIES

Subject & Title	Order Number
Industry Profiles	
Brooms	AID-IP-66154
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Lead Pencils	AID-IP-66164
Paint and Varnish Brushes	AID-IP-66166
Shell Buttons	AID-IP-66170
Book Matches	AID-IP-66219
Artists' Oil Paints	AID-IP-66227
Straight Pins	AID-IP-66249
Souvenirs and Small Jewelry	AID-IP-67281
Neon Signs	AID-IP-67291
Industrial Plants	
Hand and Power Tools: A Compilation	N76-20489/0
Plant Requirements for Manufacture of Souvenirs and Small Jewelry	PB-175540/4
Plant Requirements for Manufacture of Paint and Varnish Brushes	PB-175546/1
Plant Requirements for Manufacture of Brooms	PB-177938/8
Hog Bristle Processing By-Products and Paint Brush Manufacturing. A Feasibility Report	PB-256406/0
Plant Requirements for Manufacture of Shell Buttons.	PB-293005/5

Subject & Title	Order Number
Plant Requirements for Manufacture of Lead Pencils	PB-293010/5
Simple Methods of Candle Manufacture (Text in Spanish)	PB-296654/7
Simple Methods of Candle Manufacturing	PB-297366/7

PAPER AND ALLIED PRODUCTS

Industry Profiles

Paper Bags	AID-IP-66004
Corrugated Fiber Boxes	AID-IP-66048
Fiberboard	AID-IP-66049
Envelopes	AID-IP-66055
Cardboard Boxes and Paper Products	AID-IP-66056
Coarse Wrapping Paper (6,000 Tons Annually)	AID-IP-66079
Coarse Wrapping Paper (12,500 Tons Annually)	AID-IP-66080
Corrugated Paper Cartons	AID-IP-66081
Pulp From Bagasse for Wallboard	AID-IP-66092
Pulp From Scrap Wood for Wallboard	AID-IP-66093
Wood Pulp for Coarse Wrapping Paper	AID-IP-66097
Wood Pulp for Wallboard	AID-IP-66098
Wallboard From Bagasse	AID-IP-66125

Industrial Plants

Papermaking and Manufacture of Paper Products as a Small-Scale, Semi-Mechanized and Cottage Industry. Materials—Processes—Equipment Organization—Economics—Marketing	PB-177916/4
Plant Requirements for Manufacture of Wallboard	PB-210507/0
Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book 1	PB-212632/4
Industrial Development and Feasibility Study. Pulp and Paper Manufacturing in South Vietnam. Book 2	PB-212633/2
Plant Requirements for Manufacture of Coarse Wrapping Paper	PB-292829/9
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PERSONAL SERVICES

Industry Profiles

Dry Cleaning	AID-IP-66159
Laundry	AID-IP-66163
Dry Cleaning, Self-Service, Coin Operated	AID-IP-67283
Self-Service Laundry	AID-IP-67297
Shoe Repair Shop	AID-IP-67370

Industrial Plants

Plant Requirements to Set Up and Operate a Dry Cleaning Plant	PB-177928/9

PETROLEUM REFINING AND RELATED INDUSTRIES

Industry Profiles

Asphalt Floor Tiles	AID-IP-66067
Asphalt Paving Material	AID-IP-66203
Lubricating Oil Reclamation	AID-IP-66188

Industrial Plants

Technical Report on Lime Base Lubricating Greases	PB80-125727

PRIMARY METAL INDUSTRIES

Industry Profiles

Copper Tubing	AID-IP-66105
Copper Wire	AID-IP-66106
Brass Foundry	AID-IP-66101
Wire Nails	AID-IP-66175
Aluminum Die Castings	AID-IP-66176
Centrifugal Cast Iron Pipe	AID-IP-66179
Flexible Steel Conduit	AID-IP-66184
Galvanized Steel Pipe	AID-IP-66185
Iron Cooking Utensils	AID-IP-66187
Manganese	AID-IP-66189
Steel Mechanical Tubes	AID-IP-66198
Welded Pipe	AID-IP-66225
Gray Iron Jobbing Foundry	AID-IP-66237
Steel Bars and Shapes, 15,000 Tons Annually	AID-IP-66243
Steel Bars and Shapes, 30,000 Tons Annually	AID-IP-66244
Steel Billets	AID-IP-66245
Cast Iron Soil Pipe	AID-IP-67260
Aluminum Foundry	AID-IP-67308
Sheet Steel, Hot Rolled	AID-IP-67316
Non-Ferrous Metals Foundry	AID-IP-67346
Zinc Die Castings	AID-IP-67372

Industrial Plants

Energy Audit Workbook for Die Casting Plants	DOE/CS-0041/5
Plant Requirements to Set Up and Operate a Brass Foundry	PB-175524/8
Small Brass Foundry	PB-175532/1

Subject & Title	Order Number
Plant Requirements for Manufacture of Buckets, Pails and Pans	PB-177918/0
Plant Requirements to Set Up and Operate a Copper Wire Drawing and Insulating Plant	PB-292960/2
Plant Requirements for Manufacture of Centrifugal Cast Iron Pipe	PB-292786/1
Plant Requirements for Manufacture of Galvanized Steel Pipe	PB-292800/0
Plant Requirements for Manufacture of Manganese	PB-292823/2
Plant Requirements to Set Up and Operate a Gray Iron Jobbing Foundry	PB-292824/0
Plant Requirements for Manufacture of Copper Tubing	PB-292830/7
Plant Requirements to Set Up and Operate a Small Steel Melting Plant	PB-292869/5
Plant Requirements to Set Up and Operate Small Steel Rolling Mill	PB-292957/8
Plant Requirements for Manufacture of Flexible Steel Conduit	PB-293001/4

PRINTING, PUBLISHING AND ALLIED INDUSTRIES

Industry Profiles

Job Printing	AID-IP-66003
Small Printing Shop (Books)	AID-IP-66005
Book Bindery	AID-IP-66006
Textbook Publishing	AID-IP-66248

PROFESSIONAL, SCIENTIFIC AND CONTROLLING INSTRUMENTS: PHOTOGRAPHIC AND OPTICAL GOODS; WATCHES AND CLOCKS

Industry Profiles

Surgical Cotton	AID-IP-66016
Adhesive Tape	AID-IP-66151
Surgical Instruments	AID-IP-66172
Artificial Teeth	AID-IP-66226
Plastic Eyeglass Frames	AID-IP-66242

Industrial Plants

Plant Requirements for Manufacture of Surgical Instruments	PB-292665/7

RETAIL TRADE— MISCELLANEOUS RETAIL STORES

Industry Profiles

Liquefied Petroleum Gas (Distribution)	AID-IP-67323

RUBBER AND MISCELLANEOUS PLASTICS PRODUCTS

Industry Profiles

Rubber-Soled Fabric Shoes	AID-IP-66068
Rubber Floor Tiles	AID-IP-66069
Plastic Moldings	AID-IP-66070
Vinyl Floor Tiles	AID-IP-66071
Rubber Cement	AID-IP-66118
Camelback	AID-IP-66178
Reclaimed Rubber Sheets	AID-IP-66193
Rubberized Sheeting	AID-IP-66195
Rubber Soles and Heels	AID-IP-66196
Unbreakable Watch Crystals	AID-IP-66199
Automobile Tires	AID-IP-66229
Automobile Tires and Tubes	AID-IP-66230
Bicycle Tires and Innertubes	AID-IP-67350

Industrial Plants

Production of Insulated Footwear Using Liquid Injection Molding Equipment. 1. Method	AD-A091881/3
Plant Requirements to Set Up and Operate a Plastic Molding Plant	PB-177922/2
Plant Requirements for Manufacture of Rubber Fabric Canvas Shoes	PB-292688/9
Plant Requirements for Manufacture of Rubber Soling	PB-292769/7
Plant Requirements for Manufacture of Bicycle Tires and Tubes	PB-292785/3

STONE, CLAY, AND GLASS PRODUCTS

Industry Profiles

Glass Containers	AID-IP-66075
Mirror Manufacturing and Resilvering	AID-IP-66112
Pharmaceutical Glass (Complete)	AID-IP-66115
Sheet Glass	AID-IP-66121
Abrasive Wheels	AID-IP-66126
Asbestos-Cement Siding	AID-IP-66130
Building Bricks	AID-IP-66132
Cement	AID-IP-66133
Ceramic Dinnerware	AID-IP-66134
Kitchen Earthenware	AID-IP-66136
Mineral Wool	AID-IP-66138

Subject & Title	Order Number
Pharmaceutical Glass From Purchased Tubing	AID-IP-66140
Small Ceramics Shop	AID-IP-66145
Concrete Blocks	AID-IP-66156
Concrete Pipe	AID-IP-66157
Concrete Slabs	AID-IP-66158
Asbestos-Cement Pipe	AID-IP-66177
Concrete Cinder Blocks	AID-IP-66180
Cut Glass	AID-IP-66181
Hand Blown Glass and Fine Cast Crystal	AID-IP-66186
Marble Cutting and Polishing	AID-IP-66190
Plaster of Paris, Pottery Plaster and Plasterboard	AID-IP-66191
Porcelain Enamel Ceramic Ware	AID-IP-66192
Refractory Bricks	AID-IP-66194
Sandpaper	AID-IP-66197
Chalk Whiting	AID-IP-66207
Dry Mixture Concrete in Bags	AID-IP-66211
Soda-Lime Window Glass, 5,500 Tons Annually	AID-IP-66239
Soda-Lime Window Glass, 7,500 Tons Annually	AID-IP-66240
Soda-Lime Window Glass, 10,500 Tons Annually	AID-IP-66241
Reinforced Concrete Construction Products	AID-IP-67271
Optical or Precision Glass	AID-IP-67280
Concrete Posts	AID-IP-67285
Ready-Mixed Concrete in Bags	AID-IP-67286
Tile Roofing, Clay	AID-IP-67303
High Alumina Refractory Brick and Cement	AID-IP-67314
Wall Board From Gypsum and Fiber	AID-IP-67359
Pottery, Earthenware	AID-IP-67379

Industrial Plants

Subject & Title	Order Number
Stronger Concrete	AD-742271/0
Glass Technology	AD-769470/6
Use of RDF as a Kiln Fuel. Final Report	DOE/CS/ 20167-04
A Solar High Temperature Kiln	N82-19692/4
Creating a Ceramics Industry on the Blackfeet Reservation	PB-170306/5
Plant Requirements for Manufacture of Mineral Wool	PB-175525/5
Plant Requirements for Manufacture of High Alumina Refractory Brick and Cement	PB-175544/6
Hand-Made Blown Glass and Fine Cast Crystal	PB-175549/5
Plant Requirements for Manufacture of Ceramic Dinnerware	PB-177919/8
Plant Requirements for Manufacture of Porcelain Enamelware	PB-177931/3
Plant Requirements for Manufacture of Asbestos Cement Pipe	PB-177932/1
Plant Requirements for Manufacture of Chalk Whiting	PB-177934/7
Plant Requirements for Manufacture of Cement	PB-177936/2
Plant Requirements for Manufacture of Ready-Mixed Concrete	PB-177937/0
Plant Requirements for Manufacture of Wallboard from Gypsum and Fiber	PB-177940/4
Plant Requirements for Manufacture of Building Bricks	PB-179361/1
Plant Requirements for Manufacture of Concrete Posts	PB-292812/5
Plant Requirements for Manufacture of Sheet Glass	PB-292861/2
Plant Requirements for Manufacture of Abrasive Wheels	PB-292827/3
Plant Requirements for Manufacture of Pharmaceutical Glass	PB-293008/9
Brickmaking Plant: Industry Profile	PB-296577/0
Small Scale Cement Plants	PB-297377/4
International Forum on Appropriate Industrial Technology, Held at New Delhi/Anand, India on 20-30, November, 1978. Project Proposal and Feasibility Data for a 25 Ton/Day Mini-Cement Plant	PB80-158975
Malaysia: Small-Scale Brick Manufacturing	PB80-169766

TEXTILE MILL PRODUCTS

Industry Profiles

Subject & Title	Order Number
Men's Socks	AID-IP-66017
Silk Screen Printing on Textiles	AID-IP-66018
Hooked Rugs	AID-IP-66019
Cotton Shirting	AID-IP-66031
Terry Cloth	AID-IP-66032
Cotton Crochet and Knitting Yarn	AID-IP-66033
Woolen Yarn	AID-IP-66034
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