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Washington, D.C. 20523

IRRI

THE INTERNATIONAL RICE RESEARCH INSTITUTE

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This is a bi-monthly publication.

Office of Information Services
The International Rice Research Institute
P. O. Box 933
Manila, Philippines

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A.I.D. Personnel may desire to submit additional addresses of institutions or individuals in developing countries to be added to our mailing list for distribution of this quarterly of abstracts. We do not include individual names in the mailing list. Therefore, if you prefer that an individual receive the quarterly please give us his title and complete address of his institution.

INTRODUCTION

PURPOSE

The Agency for International Development sponsors a large amount of research in problems related to national development. Studies ranging from agriculture to economics are pursued in many universities and international research centers.

Realizing that research findings have no great value until they are in the hands of people who can make good use of them, the A.I.D. Research and Development Abstracts (ARDA) announces research and development studies as they are completed, and describes how copies of the studies can be obtained. Copies are available in paper or microfiche form, and limited numbers are available at no cost to developing countries. Purchasers of copies may use UNESCO coupons for paying.

MAILING LIST

This quarterly is mailed to more than 5,000 institutions around the world, primarily to universities and governmental offices in developing countries, but also to international agencies and foundations, to selected universities in the United States, and to staff members of A.I.D. It is hoped that wide distribution of this information about important new knowledge will stimulate an exchange of ideas and papers between academic and political leadership in developing countries and researchers and their sponsoring institutions elsewhere.

The original mailing list was assembled by listing addresses of institutions and organizations known to have a professional interest in development. Titles and positions within institutions are used rather than names of individuals because positions tend to remain in place while incumbents move from one organization to another. If we used individual names the mailings would soon become undeliverable because such mail is usually not forwarded.

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**HOW TO OBTAIN COPIES OF RESEARCH REPORTS WHICH ARE ABSTRACTED
IN THE A.I.D. RESEARCH AND DEVELOPMENT ABSTRACTS QUARTERLY.**

AGRICULTURE

GENERAL AGRICULTURE

**A GLOSSARY OF AGRICULTURAL TERMS:
ENGLISH-SPANISH AND SPANISH-ENGLISH**

The American Language Center
The American University
Washington, D.C.
1960, 107 p.

The International Cooperation Administration, predecessor of
the Agency for International Development, Washington, D.C.
20523

Reprinted by Peace Corps, March 1976
PN-AAC-259 \$8.60

**A GLOSSARY OF AGRICULTURAL TERMS:
ENGLISH-FRENCH AND FRENCH-ENGLISH**

The American Language Center
The American University
Washington, D.C.
1961, 59 p.

The International Cooperation Administration, predecessor of
the Agency for International Development, Washington, D.C.
20523

Reprinted by Peace Corps, March 1976
PN-AAC-260 \$4.75

**INTERNATIONAL WORKSHOP OF FARMING SYSTEM
(PROCEEDINGS)**

ICRISAT
1974, 556 p.

International Crops Research Institute for the Semi-arid Tropics
(ICRISAT) I-11-256
Begumpet, Hyderabad-500016 (A.P.), India

Nearly every aspect of farming in the semi-arid tropics was
examined at the workshop, and it is felt that only through the
dissemination of information and an integrated systems ap-
proach can the attendant problems be remedied. Toward that
end, this report includes the papers presented at the workshop
and the discussions following each major group of topics. The
first group, Committee I, covered those subjects related to re-
source assessment and utilization of research on farming systems
in the semi-arid tropics. Major attention was given to land, soil,
water, climate, and manpower resources for improving produc-
tion under the rain-fed conditions in this seasonally dry area.
Committee II examined the crops and cropping systems re-
search needs for the semi-arid tropics, and Committee III dis-
cussed the socio-economic problems related to farming systems
research in this area. Finally, Committee IV explored the ques-
tion of research at the cooperating centers and transfer of
technology. The group evaluated various ways for the interna-
tional institutes to play a productive role in the generation of
location-specific technology and its transfer to the different
agro-climatic and soil regions in the semi-arid tropics.

PN-AAB-810 \$44.50

**GUIDE FOR FIELD CROPS IN THE TROPICS AND THE
SUBTROPICS**

Litzenberger, S. C.
1974, 321 p.

Technical Assistance Bureau
Agency for International Development
Washington, D.C. 20523

Free copies available from Eileen Coleman, TA/PPU/EUI,
Room NS-2669, Agency for International Development,
Washington, D.C. 20523

This Field Guide is offered as a convenient aid to achieving more
efficient production of selected crops in less-developed countries
of the tropics and subtropics. It is oriented specifically toward
the small farmer rather than toward plantation agriculture, be-
cause it is the small farmer who will continue to produce most of
the foods for total consumption in both the urban and rural
sectors. The Guide is made up of 40 chapters. The first four are
general introductory chapters and treat rather extensively cli-
mate, soil, cropping, and farming systems as related to the
tropics and subtropics. The other 36 chapters are divided as
follows: six on cereal crops, nine on food legumes, six on oil
crops, seven on root or tuber crops and bananas, six on major
fiber crops, and two on other cash crops. These chapters do not
attempt to deal with the factors of providing inputs such as
national supplies of fertilizer, insecticides, and fungicides. Cre-
dit and marketing also are not covered and at the most, only brief
mention is made of the ultimate utilization of the crops. The
Guide covers only the physical and biological aspects of produc-
tion with the intention of providing a sound base for applying the
economics and social factors needed for good agricultural de-
velopment.

PN-AAB-952 \$25.70

**BUILDING AGRICULTURAL RESEARCH SYSTEMS IN THE
DEVELOPING NATIONS**

Moseman, A. H.
1970, 140 p.

The Agricultural Development Council, Inc.
630 Fifth Avenue
New York, New York 10020

(In A/D/C monograph)

In this review of building agricultural systems in developing
countries, the following topics are examined in detail: 1) the
U.S.'s agricultural research base, 2) agricultural research or-
ganizations in the developing nations, 3) technology in U.S.
technical assistance programs, 4) adaptive research, 5)
specialized agricultural research institutes, and 6) strengthening
national research systems. From this study it was concluded that
world food deficits reached a critical stage in 1965-66 as the
culmination of a continuing neglect of agriculture and of agricul-
tural technology in the developing nations. However, special
intensive food grain production programs in Asia's developing
countries from 1966 through 1968 have brought many of these
countries to approximate food grain self-sufficiency or to the
expectation that their domestic requirements could be met within
a few more years. Nevertheless, short-term food grain produc-
tion campaigns have not ended the food-population crisis but
merely have bought more time. Food needs are being met in part
by improved wheat and rice varieties but will depend most heav-
ily on improved technology. The development and adaptation of
this new technology to meet future needs must be made increas-
ingly in and by the developing nations themselves. Deficiencies
in existing national research capabilities in the developing coun-
tries have numerous factors, many of which may seem minute
but for which there is no single solution. They can be determined
only by a thorough study of each national situation. Substantial
progress could be made by strengthening national research sys-
tems through moderate modification of the several individual
projects supported by a variety of national, international, and
private organizations to ensure positive contributions to the in-
stitutional building objectives.

PN-AAC-063 \$11.20

AGRICULTURE

CEREAL CROPS

MAJOR RESEARCH IN UPLAND RICE

International Rice Research Institute (IRRI)
1975, 261 p.

International Rice Research Institute
Los Banos, Laguna
Philippines P.O. Box 933
Manila, Philippines

Copies available from Information Services, IRRI, P.O. Box 933, Manila, Philippines. \$2.00 surface mail, \$5.00 airmail. Make checks payable to Information Services, IRRI.

The material included in this bulletin summarizes the results of IRRI research conducted on selected aspects of upland rice from 1962 through 1973. The purpose of the bulletin is to help scientists develop improved rice varieties and technologies for the world's millions of small and poor rice farmers. Topics discussed include the following: upland rice in Asia, Africa, Latin America; climates of upland rice regions; soils on which upland rice is grown; growth-limiting factors of aerobic soils; factors that limit the growth and yields of upland rice; varietal diversity and morpho-agronomic traits needed in upland rice varieties; drought tolerance in upland rice; control of upland rice insects through varietal resistance; diseases of upland rice and their control through varietal resistance; varietal resistance to adverse chemical environments of upland rice soils; breeding methods for upland rice; cultural practices for upland rice; studies on insect pests of upland rice; pesticide residues in upland rice soil; mineral microbial transformations in upland rice soil; and future emphasis on upland rice.

PN-AAC-198

\$20.90

CHANGES IN RICE FARMING IN SELECTED AREAS OF ASIA

International Rice Research Institute (IRRI)
1975, 380 p.

International Rice Research Institute
Los Banos, Laguna
Philippines P.O. Box 933
Manila, Philippines

Copies available from Information Services, IRRI, P.O. Box 933, Manila, Philippines \$2.50 surface mail, \$6.00 airmail. Make checks payable to Information Services, IRRI.

The primary objective of this research was to provide information on farm changes associated with the introduction of the new rice technology. From 150 to 200 farms were sampled from the one to three villages chosen in each of the 14 study areas. In at least one of these villages, most of the farmers interviewed had realistic reasons for adopting the new rice technology. They are: 1) a supply and control over water that would permit the farmers to plan on producing two or more crops each year, 2) ready physical access to the inputs required in the new technology, and 3) reasonably good access to markets for produce. In conclusion, physical environmental factors such as irrigation, flood control, pests and diseases, and soil quality appear to be as important as the institutional factors of farm size, tenure, credit, and price policy, in determining the nature, magnitude, direction, and beneficiaries of the new rice technology. Poor environmental and institutional conditions tend to go hand in hand with occasional mitigating circumstances which cushion the extremes of consequences. Therefore, policies designed to modify, improve, or control the institutional factors will have far-reaching implications as to who benefits. The influence of the second set of factors is very dependent on the nature of the physical environment. An area with good irrigation also may have good roads, extension services, credit, a research station, more available

inputs, and better prices for products. In a swampy, remote area, very few, if any, of these facilities or services can be found. The interlocking chain of "positives" or "negatives" has to be broken somewhere in order to improve the lot of the disadvantaged.
PN-AAC-199 \$30.40

THE STRUCTURE OF REGIONAL RICE PRODUCTION IN THE PHILIPPINES

Antiporta, D.B.
1976, 188 p.

Department of Agricultural and Applied Economics,
and Economic Development Center
University of Minnesota
St. Paul, Minnesota 55101

(Doctoral dissertation - University of Minnesota)

The principal objective of this study is to establish the impact of the agroclimatic factors on rice production in the Philippines. Using discriminant analysis, homogeneous regions were delineated on the basis of different sets of agroclimatic variables such as land resource characteristics, agricultural infrastructures, population characteristics, soil types, and rainfall. Farm-level production relationships were estimated from rice production and input data for 2,459 irrigated farms. The functions included the usual farm inputs, a technology variable, and agroclimatic factors as regressors. The scheme of homogeneous regions was employed to generate dummy variables to represent the agroclimatic environment. By locating the farms in the homogeneous groupings, the agroclimatic characteristics could be specified for each observation. The analysis indicates that land and labor resources, as well as agricultural infrastructures, would be the key variables in developing the capacities in the agricultural sector. The results demonstrate the immediate payoffs from pest and disease control in rice. The results reported here also could be utilized to define subregions with homogeneous composite agroclimatic environment in each administrative jurisdiction. Thus programs could be conceived according to a subregion's specific needs.
PN-AAB-932 \$15.05

RESULTS OF THE FIFTH INTERNATIONAL WINTER WHEAT PERFORMANCE NURSERY

Stroike, J. E.; Wilheimi, K. D.; Johnson, V. A.; Schmidt, J. W.; Mattern, P. J.
1976, 182 p.

Institute of Agriculture and Natural Resources
University of Nebraska
Lincoln, Nebraska 68503

(In Research bulletin 276)

The Fifth International Winter Wheat Performance Nursery (IWWPN) was grown at 52 locations in 31 countries in 1973. Forty-seven of the sites were in the Northern Hemisphere and five in the Southern. The same set of wheat cultivars were grown as in the fourth IWWPN in 1972. The nursery consisted of 29 winter wheat cultivars and one spring wheat variety, Lerma Rojo 64. Field books were returned from 50 sites. Data are reported on grain yield, test weight, plant maturity, plant height, lodging, shattering, winter survival, 1000-kernal weight, frost damage, plant diseases, grain protein, and lysine content. The nursery grand mean for yield in the Northern Hemisphere in 1973, based on 44 locations, was 37.1 q/ha. For the Southern Hemisphere the nursery grand mean for yield over five locations was 26.2 q/ha. Individual nursery mean yields ranged from 8.8 q/ha at Lincoln, Nebraska, to 84.0 at Martonvasar, Hungary. Sava, a variety from Yugoslavia, was the most productive cultivar on the average over all reporting sites in 1973. Its productiveness rep-

resented a 10.6% increase over the standard yield check variety, Bezostaya 1 (USSR). Other cultivars performing better than Bezostaya 1 included Centurk (Nebraska); Rousalka (Bulgaria); Zlatna dolina (Yugoslavia); and Blueboy (North Carolina). The wide range of adaptability for these cultivars is indicated by their performance in the nursery in 1973. Cultivar means for test weight indicated the superiority of Bezostaya 1, Probstdorfer Extrem, Lancota, Centurk, and C. I. 15074. Rousalka was the earliest in days to flowering (141.9) and days to ripening (185.8), measured from January 1. There was a close positive association between plant height and percent lodging. Sava, the highest yielding cultivar over 43 locations, was only 83.9 cm tall.
PN-AAB-948 \$14.60

THIRD REGIONAL WHEAT WORKSHOP: DURUM WHEAT IMPROVEMENT, WEED CONTROL, CROP ROTATION WITH ANNUAL FORAGE LEGUMES (AND) SEED

Regional Wheat Workshop. 3d, Tunis, 1975
1975, 394 p.

CIMMYT - Centro Internacional de Mejoramiento de Maiz y Trigo
Apdo Postal 6-641
Mexico 6, D.F., Mexico

Participants in the Third Regional Wheat Workshop included scientists from the region, representatives of international development agencies, and international authorities on wheat production. Topics covered in the Workshop were chosen on the basis of current scientific interest as well as on their importance to the region: Durum Wheat, Weed Control, Crop Rotation Based on Annual Forage Legumes, and Seed Production. To increase the production of wheat, emphasis is given to increased yield per hectare rather than to cultivating new land. In achieving increased yields, new varieties and techniques must be adopted, hence the great importance of seed processing, storage, and distribution, as well as of fertilizer and weed control. Also essential is the use of leguminous plants as a replacement of fallow. Scheduled papers on these subjects are reproduced here in the language in which they were presented, with a summary in the alternative language. (French and English were the two languages used.) Field trips also were made and they are summarized here. The field trips, as well as subcommittees formed at the conference, covered the same general subjects as described above. All discussion and non-scheduled contributions are reproduced in English. Opening and closing remarks also are included, as are the pertinent tables.
PN-AAC-064 \$31.55

IMPROVED SEED AND PLANT MATERIALS PROGRAM FOR THE DOMINICAN REPUBLIC

Delouche, J. C.
1976, 80 p.

Seed Technology Laboratory
Mississippi State University
Mississippi State, Mississippi

(In TA 76-03)

This program determined that improvements in seed production and supply were needed, especially for the small farmer. Therefore a three-year project was developed to bring the quality and quantity of seed produced up to those levels needed to support adequate agricultural development. The project would concentrate on improvements in existing operations and emphasize rice, bean, and maize seed, and yucca and plantain propagules. Increasing total production and productivity with associated employment and income benefits would require substantial assistance to develop an effective and responsive production support system for the small-farm farmer, as well as assistance for a

small farm service system for distribution and marketing to ensure that these benefits are not lost in marketing inefficiencies or inequities.

PN-AAC-134

6.40

DEVELOPMENT OF IMPROVED HIGH YIELDING SORGHUM CULTIVARS; RESEARCH PROGRESS REPORT, 1975/1976

Texas A & M University
1976, 196 p.

Texas Agricultural Experiment Station
Texas A & M University
College Station, Texas 77240

(Research summary)

This second project-progress report states that among the accomplishments during 1975, were three large disease and insect screening nurseries grown in the Beeville, Texas area. Primary disease screening was for head smut and downy mildew; however, ratings also were made on advanced materials and tests for bacterial stripe, grey leaf spot, and zonate leaf spot. General observations were made on general adaptation, yield potential, standability, and grain weathering resistance. At Lubbock, large nurseries were planted specifically for lodging, MDM evaluation, resistant and greenbug resistance. During 1975, several food sorghums, grain weathering-resistant sorghums, and high-yielding grain sorghums from Coimbatore, India were introduced and are growing in quarantine. Thirteen new entries were added to the 1975 A11 Disease Nursery. These included new or improved sources of resistance to diseases, grain weathering (seed mold), lodging, charcoal rot, and greenbugs.

PN-AAC-137

\$15.70

DEVELOPMENT OF IMPROVED HIGH YIELDING SORGHUM CULTIVARS; RESEARCH PROGRESS REPORT, 1975/1976

Nebraska University, Department of Agronomy
1976, 196 p.

Department of Agronomy
University of Nebraska
Lincoln, Nebraska 68503

(Research summary)

In the development of improved high-yielding sorghum cultivars, cooperative research was conducted by teams from the University of Nebraska; North Central Region, ARS, USDA; the Rockefeller Foundation; and U.S.A.I.D. Investigations carried out during this year were: Mead Experiment Station climatic data for 1975; dryland response of six grain sorghum hybrids grown at three plant populations; sorghum-soybean cropping systems; influence of seed size and density on germination, seedling emergence, and yield of grain sorghum; growth, yield, and nitrogen update in grain sorghum grown under varying rates of mulch; screening sorghum genotypes for differential uptake and utilization of phosphorus and iron; the effects of lodging on yield, protein, and test weight of grain sorghum, effect of high temperature on photosynthesis rate of sorghum and corn genotypes; stomatal and non-stomatal inhibition of photosynthesis at high temperatures in sorghum; studies of nitrate reductase activity in sorghum in relation to heat stress; caryopsis development in two sorghum hybrids and a line; the effect of induced high temperatures on sorghum grain development; relationship between laboratory and field observations of sorghum seedlings grown under cold temperatures; whole plant respiration in grain sorghum; energy quantities and time periods associated with sorghum stages; selection for protein in grain sor-

AGRICULTURE

ghum; and sorghum breeding and genetics. No general conclusions or recommendations are given.

PN-AAC-139

\$15.70

FISHERIES

RESEARCH IN ARTIFICIAL PROPAGATION OF MILKFISH; ANNUAL REPORT, 1975/1976

Oceanic Foundation
1976, 34 p.

Oceanic Foundation
Waimanalo, Hawaii 96795

(Activity summary)

The research objective was to breed the milkfish, *Chanos chanos*, in captivity and to raise the fry from the egg. In the first year, eight very mature fish were captured and deemed ready for final spawning inducement. One fish (with eggs 0.818 mm in diameter) hydrated and was partially ovulated by two injections of 25 mg salmon gonadotropin SG-G100. The eggs were not fertilized. The injection procedure of excessive handling and sampling of three other fish resulted in early atresia (reabsorption) of the oocytes. Two fish died from the sampling and handling procedures, and two proved to be too immature with eggs below 0.6 mm in diameter. The preliminary results indicate that oocytes of 0.8 mm and above are at a critical stage (or beyond), and at which immediate hypophysantion is needed. Injection cannot be delayed. Excessive handling or stress at this stage causes rapid atresia of the oocytes. It appears that oocytes of about 0.7 mm are more suitable for reacting positively to injections. The size of an ovulated egg is about 1.2 mm in diameter. General husbandry methods have been developed for adults in captivity, and a diet formulated which appears to be acceptable. Safe handling systems have been developed using ice, and hypotheses made for the results of this treatment and general conditions of stress.

PN-AAB-943

\$2.75

AQUACULTURE IN LESS DEVELOPED NATIONS, SOME ECONOMIC CONSIDERATIONS

Gates, J. M.
1971, 13 p.

International Center for Marine Resources and Development
University of Rhode Island
Kingston, Rhode Island 02881

(Presented at the annual Conference of the Marine Technical Society, Washington, D.C. 1971)

A discussion of the benefits of fish culture development, and the potential impediments to such development. It notes that private international investment in aquacultural production will not contribute substantially to the war on hunger, although it may result in a useful contribution to the foreign exchange earnings of the less developed nations. It notes also that if aquaculture is to alleviate hunger problems, development efforts should focus on production of low-cost aquacultural projects by a low-wage indigenous labor force. Some suggested roles for the public sector in development of such an industry include funding of scientific research and the dissemination of results through the private sector, particularly results concerning improved methods of production. Public-sector efforts can also be directed toward improving the marketing process. Another role for the public sector involves identifying as early as possible the potential negative effects of technology — for example, the effects of weed and insect-control chemicals introduced to improve agricultural production.

PN-AAB-908

2.00

THE POTENTIAL FOR FISHERY DEVELOPMENT IN THE CARIBBEAN AND ADJACENT SEAS

Idyll, C. P.
1971, 16 p.

International Center for Marine Resources
University of Rhode Island
Kingston, Rhode Island 02881

(Presented at Seminar on Issues of International Economic Development, University of Rhode Island, 1971)

This report begins with a brief geographical and political history of the area and then discusses at greater length the various kinds and characteristics of fish in the Caribbean. The best source of information about the fish resources of the Caribbean has been the extensive investigations of the Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP) Caribbean Fisher Development Project. This project consisted of exploratory fishing, marketing, and training investigations, from 1963 to 1971. Exploratory fishing operations by the FAO/UNDP project uncovered no substantial new fishery resources. They have, however, increased greatly the knowledge of the stocks of demersal fishes off the Guianas, and have shown that these could be caught profitably by boats operating as far distant as Puerto Rico. The project vessels also have caught fish to be used in the marketing programs which emphasized demonstrations and improved methods for the handling and distribution of fish, both for domestic markets and export. The most difficult fishery problems of the Caribbean which still remain to be solved are social and economic. Another major problem is the shortage of trained people not only to carry out the fishing and fish-marketing, but also administer fishery development programs and to perform the necessary research on conservation, fish processing, and related matters. The report concludes that the Caribbean people must be encouraged to commit their own time and money to the fisheries programs, and to develop their own skills and resources in this important field.

PN-AAB-913

\$2.00

PROSPECTS OF THE WORLD'S FISHERY RESOURCES WITH EMPHASIS ON THE WESTERN HEMISPHERE

Sprague, L. M.
1970, 20 p.

International Center for Marine Resources
University of Rhode Island
Kingston, Rhode Island 02881

(Presented at Conference on the Sanitary Quality and Microbial Safety of Fisheries Products, Mayaguez, Puerto Rico, 1970)

The world's production from the aquatic environment, excluding whales, doubled in the decade between 1952 and 1962, from 22 million metric tons to 45 million metric tons and in the period from 1962 to the present, from 45 million metric tons to about 70 million metric tons. The most rapid growth during this period occurred in the landing of sardine-like fishes, most of which were processed as fish meal and oil, and in the tunas, flat-fish, and squid. Freshwater fish, excluding those of mainland China, accounted for about 3.25 million metric tons of the 1952 aquatic production, growing only slightly to the present. An increasing proportion of the catch is being taken in lower trophic levels. Whatever rate of conversion one adopts, species at lower trophic levels produce a greater amount of protein than do their predators. To utilize these species, we must bring into production species not now harvested in large quantities or at all. For this, we will need an imaginative partnership between harvesting technology and food technology. In managing high seas resources for continual harvest, the problems of international jurisdiction must be considered. Also, international and national arrangements for research and research institutions must de-

velop programs sufficiently broad to encompass the biological, oceanographic, atmospheric, behavioral, and social scientific programs posed by our use of the oceans in increasingly varied and conflicting ways.

PN-AAB-914 \$2.00

FISH PROTEIN CONCENTRATE; THE PRESENT AND FUTURE STATUS OF AVAILABLE OCEANIC RESOURCES

Sprague, L. M.; Arnold, Jack
1973, 24 p.

International Center for Marine Resources
University of Rhode Island
Kingston, Rhode Island 02881

A brief but thorough discussion of potential fish protein concentrate (FPC) and projections of its future harvest, accompanied by several illustrative tables. FPC ideally is that product resulting from modern technologies which has been transformed into a stable, dry, high amino acid quality, non-toxic, water-soluble, powdery, functional substance of varied use in formulated food products. It is likely that a marine resource will be a suitable raw material for commercial FPC. The ability of the aquatic environment to provide FPC will depend greatly on two classes of under-utilized resources. One is those resources without a market because of local food preferences, dietary habits, religious proscriptions, or competition by more valuable species. The other class are those known to occur in very substantial amounts but which now are not used frequently or at all for various technological or economic reasons. It is this latter group with which this report is more concerned. Alternative, (to marine resources) high quality protein supplies also are examined. In summary, on the lower level including present meal fisheries as potential supplies of FPC and future stocks of thread herring, mackerel, etc., potentials are about 50 million metric tons. On the immediate level which includes krill, and added 90 million metric tons for a total of about 140 million metric tons potentially are available. On the high level, perhaps part of the squid catch to a total of about 10% of production or 10 million metric tons as a maximum is available, and of the lantern fishes, quantities termed "vast" are available but under present or foreseeable harvesting and processing conditions these quantities are of little practical importance for FPC manufacture.

PN-AAB-915 \$2.00

FACTORS AFFECTING INVESTMENT DECISIONS IN AQUACULTURAL PROJECTS IN THE DEVELOPING WORLD, WITH PARTICULAR REFERENCE TO SOUTHEAST ASIA

Wadsworth, P. T.
1971, 36 p.

International Center for Marine Resources
University of Rhode Island
Kingston, Rhode Island 02881

The commercial aquaculture or fish farm shows great promise as a source of low cost, high quality protein. However, as few reliable data on costs and returns to the industry exist, before investment decisions are made, certain critical factors such as water quality, species selection, and climatological conditions must be evaluated. Cultural conditions affecting market acceptance must be considered, and much more definitive work on the economics of aquaculture and its development potential in less-developed countries needs to be done. Toward these ends, pre-investment surveys of the economic, climatological, cultural, and biological constraints present in the field should be conducted. At least two commercial fish farms should be set up as joint projects between Asian and American universities for instruction, research, and extension. Technical assistance is needed to develop appropriate marketing and credit institutions

and internal structures for the programs. Finally, a handbook for development workers, with a checklist of such items as details of pond and raft construction, economic criteria, etc., should be commissioned.

PN-AAB-916 \$2.90

SOCIO-ECONOMIC RESEARCH ISSUES IN FISHERIES DEVELOPMENT, A REPORT ON A WORKSHOP

University of Rhode Island, and the Agriculture Development Council of New York
1973, 12 p.

International Center for Marine Resources Development
University of Rhode Island
Kingston, Rhode Island 02881

(In Marine technical report series, No. 14)

To identify socio-economic research issues for fisheries development in the world's developing nations, 22 university and governmental personnel met for two and one-half days in October 1972, at the University of Rhode Island. Participants were divided into three working groups, with each assigned to consider issues in one of the following areas: 1) commercial fisheries, 2) artisan coastal and inland fisheries, and 3) the relationship between agriculture and fisheries. Commercial fisheries were defined as a special circumstance of deep ocean fishing, while artisan coastal and inland fisheries were defined to include the remainder of fishing activity. Past fisheries development research efforts have concentrated on locating and identifying ocean stocks, and designing capture gear and techniques and training fishermen in their use, rather than on social-economic issues. With the increasing awareness of limitations in natural fishery stocks and aquaculture potential, the interest in solving the world protein shortage with fishery products does not seem realistic and has receded. In areas of the world in which incomes are rising, increased demand and higher prices for fish and fish products can be expected, as can rapid population growth. In particular, market development and modernization, a systems management approach to river and coastal lagoon development and the integration of fisheries with agricultural enterprises seem critical.

PN-AAB-917 \$2.00

INTERNATIONAL CONFERENCE ON MARINE RESOURCES DEVELOPMENT IN EASTERN AFRICA (PROCEEDINGS)

Msangi, A. S.; Griffin, J. J. International Conference on Marine Resources Development in Eastern Africa, University of Dar es Salaam
1974, 136 p.

International Center for Marine Resources Development
University of Rhode Island
Kingston, Rhode Island 02881

The University of Dar es Salaam hosted this conference on marine resource development as a major step toward founding a center for marine resources at the university. Included in this conference report are the opening and closing addresses, and the papers presented with their supplementary comments. These papers were divided into three main groups: 1) marine resource potential and needs of Eastern Africa, 2) marine resource programs at the University of Rhode Island and their possible applicability to program development, and 3) planning an institute for marine sciences for Eastern Africa. General recommendations focused on the establishment of a marine resources

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center at the University of Dar es Salaam, the prime reason for the conference itself. These recommendations mainly were specific guidelines for the three major areas to be emphasized at the marine resources center: 1) marine affairs, coastal management, and marine advisory services; 2) marine science and ocean engineering; and 3) resource economics, sociology, and food and nutrition.

PN-AAB-918 \$10.90

EFFECTS OF AGRICULTURAL LIMESTONE ON PHYTOPLANKTON COMMUNITIES OF FISH PONDS

Boyd, C. B.; Scarsbrook, Ellen
1974, 14 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Archiv fuer Hydrobiologie, v. 74, no. 3, p. 336-349)

Lime improves conditions for plant growth, thereby providing a greater food base for fish production. Because there are few data on the effects of lime on aquatic plants, this investigation was undertaken to gather information on phytoplankton density and composition in fish ponds after liming. Fish ponds limed with dolomitic limestone increased primary production as determined by increased numbers of phytoplankters and greater phytoplankton volumes. The specific composition of phytoplankton communities was not affected obviously by liming. Favorable influences of lime resulted from one or more of the following observed changes in the pond environments: 1) increased carbon for photosynthesis following increases in bicarbonate, 2) greater availability of phosphorus added in fertilizers, and 3) increased concentrations of calcium and magnesium.

PN-AAC-038 \$2.00

FERTILIZING FARM FISH PONDS

Boyd, C. E.; Snow, J. R.
1975, 6 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Agricultural Experiment Station. Leaflet no. 88)

Fish pond owners in Alabama usually have found fertilization to be a good investment. Fertilizer nutrients increase the production of microscopic plants which in turn serve as food for microscopic animals and aquatic insects. Heavy growths of these micro-organisms (plankton blooms) and insects provide food for bream which then serve as the primary food for bass. Proper use of fertilizer in most Alabama ponds will increase fish production by four or five times. Fish in fertilized ponds are easier to catch because they are more numerous and because the abundant plankton limits their vision causing them to be less wary. Plankton also shades pond bottoms, preventing growth of troublesome rooted weeds and filamentous algae. This report outlines a simplified fertilization program for the use of 20-20-5 fertilizer at the rate of 40 lbs. per acre. Suggestions for increasing efficiency are made for fertilizers to be added to new ponds, old ponds, or those with muddy water, excess flow or weeds. Liming recommendations also are made for ponds with very soft water and for catfish ponds with or without supplemental feeding.

PN-AAC-039 \$2.00

PADDLEWHEELS FOR CATFISH POND AERATION

Busch, C. D.; Koon, J. L.; Allison, Ray
1975, 1 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Highlights of agricultural research, v. 22, no. 2)

A combination of warm weather and cloudy days in late summer can result in low oxygen levels in fed catfish ponds. Several types of mechanical aerators are being used to maintain an adequate dissolved oxygen level in the ponds. These include air blowers, submerged pumps, and propellers. New among those being developed and tested at the Agricultural Experiment Station is a paddlewheel powered by a ¼ hp. electric motor. In tests at the Auburn Fisheries Research Unit, a comparison between the paddlewheel and a pump circulation biofilter unit found that the paddlewheel maintained the oxygen level above 5 ppm., while the biofilter treatment allowed it to dip below 1 ppm. For an average power cost of \$0.04 per kilowatt hour, the cost of paddlewheel aeration would be \$0.04 per lb. of gain while the propeller-type aerator would cost \$0.09 per lb. Additional tests are being conducted to evaluate the paddlewheel's effectiveness on commercial production-sized ponds.

PN-AAC-040 \$2.00

AERATION, WATER QUALITY, AND CATFISH PRODUCTION

Busch, C. D.; Koon, J. L.; Allison, Ray
1974, 3 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Transactions of the ASAE, v. 17, no. 3, p. 433-435)

An evaluation of small pond fish production in terms of dissolved oxygen levels, power requirements, and circulation potential for several mechanical aeration systems. Evaluation of catfish pond aeration systems has shown that daytime aeration by algae overshadows mechanical aeration and can reduce power requirements. The paddlewheel (modified oxidation ditch rotor) appears as the most reliable system. The power usage per lb. of fish is low enough to provide an economical production base. Paddlewheel tests have evolved a Level Raceway Concept which promises several advantages over the conventional earthen raceway. These include: a) lowering power requirements through lower lift requirements, b) eliminating field construction of water control drop structures, and c) continuing circulation after failure of one paddlewheel. Variations of the concept might include screening to separate the fish by sections and extending the number of pond units. Flow rates also could be diminished during daylight hours by reducing the number of operating paddlewheels. When the system could not be drained annually, a larger, unstocked pond connected in a series would improve water quality.

PN-AAC-041 \$2.00

PROGRESS AND PROSPECTS OF FISH FARMING

Lovell, R. T.; Smitherman, R. O.; Shell, E. W.
1976, 39 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In "New Protein Foods" to be published by Academic Press, New York)

There commonly are three levels of fish farming: 1) fish produced

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exclusively from natural aquatic foods, 2) fish produced by supplementing natural foods with artificial feed, and 3) intensive fish farming under artificial conditions. Besides these, this report discusses also the benefits of fish farming as a source of animal protein and the desirable characteristics of fish for farming such as growth rates, efficient utilization of natural foods, tolerance to water conditions, and disease resistance. In examining present and potential yields through farming selected species of food fish, carp, channel catfish, trout, eels, tilapias, and the polyculture of several species are described. Finally, the technology of utilizing farm-raised fish is reviewed, including domestication of species with desirable consumer or cultural qualities, hybridization, polyculture, computer calculations of least cost rations, hypertensive raceway cultures, reuse of water, and development of new consumer fish products. It seems inevitable that fish farming will increase its contribution to discriminating consumers in both high and low income markets.

PN-AAC-042 \$3.15

PROCESSING FARM-RAISED CATFISH

Lovell, R. T.; Ammerman, G. R.; Boggess, T.S.; McCoy, E. W.; Oravetz, C. A.
1974, 60 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Southern cooperative series, Bulletin 193)

An evaluation of the present state of catfish processing and a collection of relevant technical information on catfish processing and marketing. The objective of this report is to bring together existing technical and commercial information from all available sources and present it in practical terms so that it will be of immediate value to the catfish industry. The longest chapter of this report is on "the state of the art of catfish processing" and discusses processing facilities; water disposal; personnel; ice-hauling of catfish; cleaning, skinning and sizing of fish; labeling and handling practice; microbiological standards; storage and marketing. Other chapters cover the processing industry, processing economics, economic utilization of processing waste, the off-flavor problem in farm-raised catfish, commercially smoked catfish processing and marketing and finally, there is a list of available literature on the subject.

PN-AAC-043 \$4.80

FISH FEEDS AND NUTRITION; COOL WEATHER FEEDING OF CHANNEL CATFISH

Lovell, R. T.
1975, 3 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Commercial fish farmer and aquaculture news, May/June 1975, p. 28-29)

In fish whose body temperature varies with water temperature, digestion and metabolism also are very much affected by water temperature. Fish feed less consistently during cool weather, and nutrient requirements, the ability to assimilate some types of food, and the deposition of body fat and protein in warm water fish all are affected by change in water temperature. Although there has been relatively little research directly related to cool weather feeding of farm-raised channel catfish, the following nutrition-water temperature interrelationships have been demonstrated with warm water fish: 1) Food moves through the gut more slowly at low temperatures; 2) Catfish will feed when hungry, or the gut is empty, even at very low water temperatures. However, at low temperatures, the gut empties more slowly and

the fish may not become hungry as quickly as at higher temperatures; 3) Percentage digestibility and/or metabolism of starch and vegetable proteins is poorer at lower water temperatures; 4) Fish respond to higher percentages of protein at higher water temperatures; 5) Water temperature affects deposition of fat and protein in the body of intensively-fed channel catfish. A winter-feeding experiment to measure changes in weight and body composition (fat and protein) of channel catfish concluded that winter feeding was much more profitable than not feeding and that the fed fish contained more protein and less fat than the non-fed fish. The fed fish also had higher percentages of protein than fall-harvested catfish.

PN-AAC-044 \$2.00

FISH FEEDS AND NUTRITION; HOW MUCH PROTEIN IN FEEDS FOR CHANNEL CATFISH?

Lovell, R. T.
1975, 2 p.

Department of Fisheries and Allied Aquaculture
Auburn University
Auburn, Alabama 36830

(In Commercial fish farmer and aquaculture news, March-April 1975, p. 40-41)

Technical reports have indicated that the optimum levels of protein feeds for growth of intensively-cultured channel catfish has ranged from 25 to 45 percent. These conclusions are based on specific percentages of protein found best for growth or profit under experimental conditions. The most important factors affecting the growth response of channel catfish to feeds containing different levels of protein are: 1) size of fish, 2) water temperature, 3) natural food available, 4) daily feed allowance, 5) amount of non-protein energy in the feed, and 6) quality of the protein. These factors, based on various experiments, are detailed in this report. All are found to have a great influence on the percentage of protein thought best for catfish feeds, and each must be considered when interpreting research data or developing productive rations.

PN-AAC-045 \$2.00

FORESTRY

EXPLORATORY KRAFT AND NSSC PULPING OF MIXTURES OF 50 PHILIPPINE HARDWOODS

Laundrie, J.F.
1976, 18p.

Forest Products Laboratory,
Forest Service,
U.S. Department of Agriculture
Madison, Wisconsin

(In AID Report No. 1)

Kraft pulps were made using three chip mixtures of hardwood species imported from the Philippines for experimental processing. The quality of the kraft pulps produced was equal to or better than those made from North American hardwood. Air classification of the wood chip mixtures can further improve the quality of the kraft pulps. Repeated recycling of the black liquor in kraft pulping did not appear to cause detrimental effects in either the liquors or the pulps. High-yield kraft pulping with 25-30 percent screening for use in the manufacture of a corrugating medium appears to be a feasible method of producing both the corrugating medium and linerboard with only one pulping process. Neutral sulfite semichemical pulps made from the mixtures appear to be suitable for the manufacture of a corrugating medium.

PN-AAC-001 \$2.00

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NEWSPRINT FROM MIXTURES OF PHILIPPINE HARDWOODS

Laundrie, J.F.; Fahey, D.J.
1976, 10p.

Forest Products Laboratory
Forest Service
U.S. Department of Agriculture
Madison, Wisconsin

(In AID Report No. 2)

This report presents the results of a study of the suitability of Philippine hardwoods for the manufacture of newsprint paper. Newsprint of acceptable quality was made from 100 percent Philippine hardwoods consisting of (1) 70 percent thermomechanical pulp and 30 percent kraft, and (2) 80 percent thermomechanical pulp and 20 percent long-fiber sulfite pulp. The three conclusions of the study: Acceptable newsprint can be made from 100 percent tropical hardwoods for the local markets, but may require the addition of a small quantity of long-fiber pulp for the world market. The hardwood thermomechanical pulp requires bleaching for use in newsprint, and the newsprint furnishes need to be dyed to approach the tint of North American newsprint. The printability and optical properties of the newsprint are better with higher levels of thermomechanical pulp.

PN-AAC-002

\$2.00

TABLET PAPERS FROM MIXTURES OF PHILIPPINE HARDWOODS

Laundrie, J.F.; Fahey, D.J.
1976, 15p.

Forest Products Laboratory
Forest Service
U.S. Department of Agriculture
Madison, Wisconsin

(In AID Report No. 3)

This report presents the results of a study of the suitability of Philippine hardwoods for the manufacture of tablet papers. Tablet paper of acceptable quality was made from a furnish containing 60 percent Philippine hardwood kraft pulp, 20 percent Philippine hardwood thermomechanical pulp, and 20 percent Philippine hardwood thermomechanical pulp, and 20 percent commercial long-fibered pulp. Increasing the amount of thermomechanical pulp in the furnish resulted in a decrease in all properties except opacity. The conclusion drawn from the study is that acceptable tablet paper can be made by using as much as 80 percent Philippine hardwoods. Part of the hardwood can be prepared by the thermomechanical pulping process, but this pulp will require bleaching even when using only the light-colored species of hardwoods.

PN-AAC-003

\$2.00

TISSUE AND TOWELING PAPERS FROM MIXTURES OF PHILIPPINE HARDWOODS

Laundrie, J.F.; Fahey, D.J.
1976, 17p.

U.S. Department of Agriculture
Forest Service, Forest Products
Laboratory, Madison 5, Wisconsin

(In AID Report No. 4)

This report establishes the suitability of Philippine hardwoods for the manufacture of tissue and toweling papers. Fifty species of Philippine hardwoods were used to make pulps for the tissue and toweling trials. The chips were made from bark-free wood in a commercial size four-knife chipper. The nominal length of the

chips was $\frac{5}{8}$ inch, and the fines and oversize were removed prior to blending of the individual species to obtain the mixtures. The mixture for the kraft pulp contained equal amount (dry weight basis) of 47 species, and the mixture for the thermomechanical pulp contained equal amounts of the three lightest colored woods. Acceptable quality papers were made from furnishes containing 80% Philippine hardwood kraft pulp and 20% commercial long-fibered pulp. No significant changes in the quality of the papers were found in replacing half of the hardwood kraft pulp with a Philippine hardwood thermomechanical pulp.

PN-AAC-176

\$2.00

HARDBOARDS FROM MIXTURES OF PHILIPPINE HARDWOODS

Myers, G.C.; Fahey, D.J.
1976, 16p.

U.S. Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

(In AID Report No. 5)

This report establishes the suitability of Philippine hardwoods for the manufacture of hardboard. Low energy was required to fiberize the chips into hardboard fiber. High-density hardboards, made from several chip mixtures by both the dry- and wet-formed processes, easily met the Voluntary Product Standard for standard hardboard. Dry-formed, medium-density hardboard made with urea resin had strength properties suitable for furniture core stock. Medium-density hardboard made with phenol-resorcinol resin had strength accelerated aging properties suitable for exterior siding application. All hardboards had excellent surface characteristics, which are desirable in finishing.

PN-AAC-177

\$2.00

IRRIGATION

WATER REQUIREMENTS MANUAL FOR IRRIGATED CROPS AND RAINFED AGRICULTURE

Hargreaves, G.H.
1975, 43p.

Agricultural and Irrigation Engineering
Utah State University
Logan, Utah 84322

Methods for estimating potential evapotranspiration, ETP, from climatic data and from Class A pan evaporation. Crop Evapotranspiration, ET (Crop), is figured from ETP and crop coefficients, KC. Desirable irrigation efficiencies are suggested, leaching requirements are defined, and soil conditions and other factors influencing the amount of water to be applied are described. A procedure is presented for scheduling irrigation using principally mean monthly climatic data. A concept of dependable precipitation is developed and used to relate to moisture adequacy and crop production or in the development of moisture adequacy production functions. Critical periods for moisture stress are given for a large number of crops. A classification of moisture deficits and climate is proposed to be used principally for evaluating precipitation potential for rainfall agricultural. Computer equations are shown for calculating potential evapotranspiration, dependable precipitation, evapotranspiration deficits, and a moisture availability index.

PN-AAB-676

\$3.45

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Example: PN-AAB-000

TRICKLE (DRIP) IRRIGATION, ABSTRACTS OF REFERENCES

Keng, J. Ching-win
1975, 40p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(In Agronomy mimeo 75-16)

This two-part publication contains, in Part I, 71 abstracts of journal articles, reports, and theses on the subject of trickle (drip) irrigation. The abstracts were selected from 355 in a computer printout produced from a search of the literature in the Northeastern Water Resource Information Terminal, Engineering Library, Cornell University. The literature citations and abstracts are classified into five groups: General Progress; Physics and Mathematical Models; Management and Mechanics; Water Use, Salinity, and Fertilization; and Crop Response. Part II of this publication consists of 74 references taken from the Second International Drip Irrigation Congress Proceedings (July 7-14, 1974). The citations are organized under headings similar to those used in Part I.

PN-AAB-869

\$3.20

TRICKLE-DRIP IRRIGATION: PRINCIPLES AND APPLICATION TO WATER MANAGEMENT IN TROPICAL SOILS

Bresler, Eshel
1975, 81p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(In Agronomy mimeo 75-14)

A series of lectures which present the known general principles of trickle irrigation systems. It then applies the principles to the design of a trickle irrigation system for three representative soils of the tropics, from Puerto Rico and Brazil, using soil hydraulic data and crop response information obtained by Wolf and Drosdoff (1974) and Wolf (1975). The use of trickling or dripping as a method of irrigating large fields has become quite common practice all over the world the method is now one of the fastest growing new technologies in agriculture. U.S. acreage under drip irrigation has increased from 100 acres in 1970 to more than 70,000 acres in 1974. The five-year projection is for over 218,000 acres in the U.S. and for at least 100,000 acres in other countries. Trickle irrigation is being adapted to almost all types of crops and all types of land, including land which could not be used previously for successful agriculture. The topics discussed in this publication include the following: important features of trickle irrigation; some problems concerning practical use; modeling of water and salt flow; soil water regime during infiltration; application of infiltration models to the design of a trickle irrigation system; and application to water management in tropical soils.

PN-AAB-870

\$6.50

RELATIONSHIP AMONG IRRIGATION-MEDIA REGIMES AND PLANT GROWTH

Stern, J.H.; White, J.W.; Cunningham, R.L.; Cole, R.H.
1975, 9p.

Department of Agronomy
Pennsylvania State University
University Park, Pennsylvania 16802

(In Plant and soil, V. 43, No. 2, pp. 433-441)

The methods and results of a study designed to evaluate the effect of media of three sizes and the effect of irrigation frequency on the growth of *Chrysanthemum morifolium* Ramat. Factors limiting growth in media culture are oxygen, nutrients, and water. These factors are dependent on particle diameter, nutrient solution composition, and irrigation frequency. This study of media on the growth of chrysanthemums irrigated with a complete nutrient solution. Plant height, fresh weight, dry weight, and flower diameter were used to measure growth. Media used were coarse incinerated anthracite refuse, fine incinerated anthracite refuse, and soil material from the B21 horizon of Gatesburg sand. Fine incinerated anthracite refuse irrigated either constantly or every four hours produced the best results, whereas Gatesburg sand irrigated daily resulted in less growth than other treatments. Excess water held in finer-textured media causes oxygen deficiency and substandard growth.

PN-AAB-871

\$2.00

LEGUME CROPS

EVALUATION OF MUNGBEANS (VIGNA RADIATA/L./WILCZEK) STRAINS AT COLUMBIA, MISSOURI, 1974

Watt, E.E.; Swindell, R.E.; Aggarwal, V.D.; Purivirojkul, Wachara; Sechler, D.T.; Poehلمان, J.M.
1975, 35p.

Department of Agronomy
Missouri Agriculture Experiment Station
Columbia, Missouri 65201

(In Miscellaneous Publication No. 75-6)

This report lists the data recorded on the 1367 strains of mungbeans grown in 1974. The 1974 growing season was the most unfavorable so far experienced from the standpoint of weather and disease. The wet, compacted soil and the low temperatures resulted in poor germination and poor stands. An extremely heavy virus infection (unidentified but believed to be vectored by aphids) first was observed while the plants were only a few weeks old. The weather may have influenced the virus by delaying planting and restricting early growth and by favoring the spread of the insect vectors. The mungbeans were planted in single-row plots five or fifteen feet in length with a three-foot space between rows. Seventy-five seeds were planted in each plot, and seed was inoculated with Rhizobium culture EL from The Nitrogen Company and treated with thiram (tetramethylthiuram disulfide). Harvesting was done by picking ripe pods. Two or more pickings were made on most of the plots. Due to the heavy virus, many strains were abandoned without harvesting. In other strains only sufficient pods were harvested to permit obtaining 1000-seed weight and to observe seed luster and color.

PN-AAB-820

\$2.80

RELATIONSHIP BETWEEN THE CONTENT OF OIL, PROTEIN, AND SUGAR IN MUNGBEAN SEED

Hymowitz, Theodore; Collins, F.I.; Poehلمان, J.M.
1974, 6p.

Department of Agronomy
University of Missouri
Columbia, Missouri 65201

(In Tropical Agriculture, V. 52, No. 1, p. 47-51)

Seed of 32 strains of mungbeans (*Vigna radiata* (L.) Wilczek) were analyzed for protein, oil, total sugar and individual sugar content. The ranges in values were: protein, 24.5 to 31.2; oil, 0.57 to 0.84; total sugar, 2.69 to 5.88; monosaccharides, 0.38 to 0.69; and stachyose, 0.50 to 1.50 g per 100 g seed. The oligosaccharides verbascose and ajugose possibly were detected, but standards were not available for confirmation. Simple correla-

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tion analysis revealed that oil and protein are negatively associated ($P < 0.01$). The correlation coefficients between total sugar and oil and total sugar and protein were positive but not significant ($P > 0.05$). Stachyose was associated positively with raffinose, monosaccharides, and total sugar content ($P < 0.01$) and protein ($P < 0.05$) but not significantly associated with sucrose or oil content.

PN-AAB-822 \$2.00

REGRESSIONS, CORRELATIONS, AND COMBINING ABILITY IN MUNGBEANS (*VIGNA RADIATA*/L./WILCZEK)

Yohe, J.M.; Pehlman, J.M.
1975, 10p.

Department of Agronomy
University of Missouri
Columbia, Missouri 65201

(In Tropical Agriculture, V. 52, No. 4, p. 343-352)

Five mungbean (*Vigna radiata* (L.) Wilczek) strains, selected for their diverse plant characteristics and origins, were evaluated for ten variables in a diallele experiment using repression coefficients, correlations, and combining ability estimates. Repression coefficients were high, indicating large additive effects for most of the variables. Yield was correlated positively with number of pods per plant, number of seeds per pod, 1000-seed weight, and plant size as measured by plant height and branch length, and negatively correlated with virus score. Negative correlations of yield with late flowering and mildew score were not significant. Genetic variability among F plants for the ten variables was accounted for largely by highly significant general combining ability (GCA) effects, although specific combining ability (SCA) effects were observed for five traits. GSA effects were much larger than SCA effects, SCA effects being not significant in general, suggesting that the variables are controlled predominantly by loci with additive gene effects. Hence, classical breeding systems which made use of additive genetic variance would be effective here.

PN-AAB-837 \$2.00

A RATING SYSTEM FOR DETERMINING SOYBEAN YIELD REDUCTION BY *CEPHALOSPORIUM GREGATUM*

Gray, L.E.; Thapliyal, P.N.; Sinclair, J.B.
1970, 1p.

Department of International Plant Pathology
University of Illinois
Urbana, Illinois 61801

(In Phytopathology, V. 60, No. 6, p. 1024)

This report proposes the use of a rating system for field surveys, based on the extent of stem browning as a measure of disease severity. To test the method, soybean fields were surveyed for the incidence and severity of brown stem rot in the east central region of Illinois in September of 1968 and 1969. On the basis of a three-point rating system, plants rated in the third class yielded significantly less than plants in the first and second classes. This is the first case where a rating system has been used to reflect yield of soybeans infected with *C. gregatum*. The system is simple, can be used at a timely period in the growth cycle, and is effective over a variety of conditions. In view of evidence that this disease is spreading over vast acreages of the soybean crop, this method of surveying damage might be useful for workers in several states where an analysis of severity is needed.

PN-AAB-860 \$2.00

Please use the publication number in ordering.
Example: PN-AAB-000

UPTAKE AND TRANSLOCATION OF SYSTEMIC FUNGICIDES BY SOYBEAN SEEDLINGS

Gray, L.E.; Sinclair, J.B.
1970, 3p.

Department of International Plant Pathology
University of Illinois
Urbana, Illinois 61801

(In Phytopathology, V. 60, No. 10, pp. 1486-1488)

Five fungicides known to be systemic in plants other than soybean were found to be fungitoxic to four soybean pathogens: *Diaporthe phaseolorum* var. *caulivora*, *D. phaseolorum* var. *sojiae*, *Cercospora kikuchii*, and *Cephalosporium gregatum* in vitro. The fungicides were benomyl, chloroneb, DCMOD, DMOC, and TBZ. TBZ was evaluated against only *D. phaseolorum* var. *sojiae*, and not against the other three pathogens. Some fungitoxic component of benomyl, chloroneb, and TBZ moved systematically in soybean seedlings after seedling roots were exposed to the chemicals. It was not ascertained whether the specific fungicide or a compound related to it accounted for fungitoxicity in treated seedling tissues. DCMOD and DMOC were phytotoxic at the levels tested, and could not be bioassayed for systemic activity. Benomyl and TBZ tended to accumulate in the cotyledons of treated seedlings, but not in the hypocotyl tissues. This may account, in part, for the general lack of success in using these fungicides as seed and soil treatments for disease control in soybean seedlings.

PN-AAB-861 \$2.00

LIVESTOCK

REPORT ON THE RUMINANT PRODUCTION SITUATION AND PROSPECTS IN GUYANA

Morris, Wilford; Candler, Wilfred
1973, 89p.

Department of Agricultural Economics
Purdue University
West Lafayette, Indiana 46207

Appendix 4: Purdue University, Dept. of Agricultural Economics, Annual Report, 1972/1973

Guyana, which has a much larger land base in relation to its population than the other countries in the region, naturally considers that it should be able to fulfill its own demand for beef and also have a substantial surplus for export. Guyana is currently a low-cost beef producer, and the government policy seems to favor retention of beef prices below import parity. About half the cattle research resources in Guyana have been spent at Ebini, in the intermediate savannah, without producing an economically viable method of livestock production. At existing price levels, cattle production is marginally profitable for current producers, but no clearly profitable areas for expansion exist. Cattle appear to be slaughtered at very low weights, partly because of the likelihood of theft, and partly because of the lack of a differentiated market for finished beef. The IRBD loan means that plans already exist for expansion of beef production at close to maximum speed. This means that the Guyanese are now interested in the development of other types of ruminant. Through Guyana has a large land base, intensive production systems have been developed only for the coastal clays. Profitable exploitation of the remaining land areas awaits development of appropriate production systems.

PN-AAB-980 \$7.15

OBSERVATIONS ON THE GUYANESE LIVESTOCK INDUSTRY

May, R.D.; White, T.K.
1974, 56p.

Department of Agricultural Economics
Purdue University
West Lafayette, Indiana 46207

Appendix C: Purdue University
Dept. of Agricultural Economics
Annual Report, 1973/1974

During 1974 members of the Purdue 211(d) team made two visits to Guyana to collect data on the structure of Guyana's livestock industry and to discuss with government and industry representatives the problems and opportunities facing the industry. Livestock production is the third most important source of agricultural income in Guyana, following sugar and rice, which are produced on irrigated land on the coast. Guyana has large areas of land which are not being exploited agriculturally. Much of this land is subject to long dry periods and has limited natural fertility. Other areas are heavily forested and isolated from major product and factor markets. It has been suggested that these large areas of unused land might be used for greatly expanding livestock, especially beef cattle, production. A market to absorb increased beef production exists both domestically and in neighboring Caribbean countries, almost all of which are net importers of beef. The four areas in Guyana believed to be important livestock production regions are the Coastal Lands, the Intermediate Savannahs, the Northwest District, and the Rupununi District. Commercial livestock production is now concentrated in the Coastal Lands and the Rupununi District. The Guyanese cattle herd reached a peak of about 300,000 head in 1975, and has declined since then to about 100,000. Most of the decline has occurred in the Coastal Lands, evidently because of low prices for both beef and milk, a trend toward double-cropping of rice, and a very serious problem of cattle rustling. Total beef production in the country is current about 9.5 million pounds per year, or about 12 pounds per capita. Milk production is estimated at about 45 million pounds, and some 60 million pounds of milk is imported. Both milk and meat consumption is concentrated geographically in Georgetown and the heavily populated coastal region. Thus, expanding production in other regions will present assembly and transportation problems. At present there is little processing of either milk or meat. The milk is consumed as unpasteurized, and meat is consumed fresh—within two or three days after slaughter.

PN-AAB-993 \$4.50

REPORT ON ACTIVITIES IN JAMAICA, BARBADOS AND TRINIDAD, JANUARY 1974

May, R.D.; McCarl, Bruce; Minden, Arlo; White, T.K.
1974, 21p.

Department of Agricultural Economics
Purdue University
West LaFayette, Indiana 46207

Appendix E: Purdue University, Dept. of Agricultural Economics, Annual Report, 1973/1974

The four members of the Purdue 211(d) team visited Jamaica, Barbados, and Trinidad in January, 1974, to collect information on livestock production and marketing systems and to investigate the availability of data useful for determining the potential demand for Guyanese beef. The original trip plan included a week in Guyana for preliminary data collection, but clearance for travel to Guyana was not given and that part of the trip was canceled. In Jamaica, where 10 percent of the farmers have 90 percent of the land, the cattle population is about 250,000 animals. About 20 percent of the beef produced in Jamaica is finished in small, independent feedlots. Fed animals are currently selling at a price of \$.43-.45 per pound. Beef is typically purchased by butchers who travel through the countryside to collect cattle for slaughter. Existing slaughter facilities are not

modern. The hotel trade imports its meat from the U.S. and Canada. No tax is levied on imported beef. In Barbados, most of the cattle production is dairy. Beef sells in the market for about \$.90 per pound. Barbados, like most of the West Indies, will not import beef from Guyana because of the presence of foot and mouth disease in the Rupununi District of Guyana. Most if not all of the hotel beef consumed in Barbados is imported from the U.S. and Canada. Canadian Cane consultants have been developing a machine to separate sugar cane into three components: fiber, wax, and comfith. The comfith is being fed to cattle as a high-energy feed. The machine costs about \$35,000 and can produce four tons of comfith per hour. It was estimated that five to ten percent of the cane produced in Barbados could feed out enough beef to meet the current demand. Sugar cane requirements are such that 350 acres of cane could produce enough comfith to feed out 1680 bulls to slaughter weight in 18 months from birth. The comfith is now being used experimentally in both pig and dairy rations. In Trinidad, scientists at the University of the West Indies are planning to put in a large-scale feedlot in Mexico, using comfith as the primary energy source. Trinidad has its own source of urea, an additive, from the offshore oil producers. Caroni, Ltd., in Port of Spain, has been working on selective breeding of water buffalo to develop a good blood line for meat production. The water buffalo are very well adapted to production in very wet, low lying areas such as the river valleys of Guyana. Most of the beef currently produced in Trinidad is a product of the dairy industry; the bulls are slaughtered at a very young age. Holsteins are the dominant breed used in Trinidad. In most of the West Indies, the lack of adequate farmer training is a major obstacle to increased livestock production.

PN-AAB-995 \$2.00

SURVEY OF LIVESTOCK PRODUCERS IN GUYANA

Cooper, G.E.; Howze, Glenn
1975, 67p.

Department of Agricultural Science
Tuskegee Institute
Tuskegee Institute, Alabama 36088

(In Tuskegee Institute, Dept. of Agr. Sciences, Annual Report, 1974-1975; 211(d) Livestock Project. Appendix 1, pp. 11-78)

This study focuses primarily on beef and dairy cattle production in Guyana, with data on swine, poultry, sheep, and goat producers also collected. Specifically, the following types of information were provided: 1) socio-economic profile of livestock producers, 2) characteristics of land use, 3) breeding program, 4) herb health data, 5) nutritional information, 6) marketing practices, 7) involvement with and attitudes toward livestock extension programs. As a result, one hundred twelve livestock producers were interviewed during the survey. Table I presents the number of interviews from each of the two major geographical areas and each of the sub-areas. Forty-two (38%) of the respondents were from the Rupununi District and seventy (63%) were from the Coastal area. With regard to the sub-areas, a substantial portion of the interviews in the Rupununi were from each of the sub-areas. On the Coast there was more of a concentration of producers; twenty-five (35.7%) of Coastal respondents were from East Coast Demerara.

PN-AAC-156 \$5.40

SURVEY OF LIVESTOCK EXTENSION PROGRAMS IN GUYANA

Braye, E.T.; Brown, P.W.; Cooper, G.E.
1975, 25p.

Department of Agricultural Science
Tuskegee Institute
Tuskegee Institute, Alabama 36088

AGRICULTURE

(In Tuskegee Institute, Dept. of Agr. Sciences. Annual report, 1974/1975: 211(d) Livestock Project. Appendix 2, p. 79-100)

This extension survey is an evaluation of the total extension program in a developing tropical country. This is in context with the over-all "systems approach" to development and has the following objectives: 1) to define the objectives of the livestock extension program for Guyana, South American (Ministry of Agriculture Objectives), 2) to evaluate the administrative organization of the livestock and veterinary components of extension, 3) to determine areas of livestock extension involvement, 4) to determine government program plans for livestock producers, 5) to identify the source(s) of information available to livestock producers, 6) to identify problems encountered by those persons implementing extension program plans, 7) to evaluate incentives which may be used to maintain qualified livestock extension personnel, and 8) to evaluate livestock extension training programs. The over-all survey objectives thus would be to define the extension services' plans for implementing production changes relevant to the livestock production enterprises in Guyana. As a result of this survey, during the discussions which were held with Ministry personnel, several objectives were described which, in unspecific terms, were over-all extensions objectives. They are: 1) to diversify agricultural production; 2) to develop ranching systems (cooperatives, corporations, and small production systems) for beef cattle production in order that the income derived from such systems might be increased; 3) to develop livestock programs based on regional priorities; 4) to develop programs for income distribution between the small and large livestock sectors; and 5) to increase export promotion.

PN-AAC-157

\$2.00

SOME COMMON FORELIMB DISEASES IN THE EQUINE

Padmore, C.L.
1975, 17p.

Department of Agricultural Science
Tuskegee Institute
Tuskegee Institute, Alabama 36088

(In Tuskegee Institute, Dept. of Agr. Science. Annual report, 1974/1975: 211(d) Livestock Project. Appendix 6, p. 120-136)

A brief paper which discusses the slides illustrating symptoms and methods of treatment for each problem. The common forelimb lamenesses in equines covered are: puncture wounds of the sole and subsolar abscess, laminitis, navicular disease, fracture of the third phalanx, fracture of the first and second phalanges, ringbone, traumatic arthritis of the fetlock joint, fractures of the fetlock joint, fractures of the margin of the first phalanx, sesamoid fractures, tendosynovitis, periostitis of the third metacarpal, splints, fracture of the splint bone, carpalitis, and fractures of the carpal bones.

PN-AAC-158

\$2.00

PESTICIDES

PESTICIDE MANUAL, PT. 1: SAFE HANDLING AND USE OF PESTICIDES

Von Ruemker, Rosemarie; Horay, Freda
1972, 173p. (632.95.R936)

Department of Entomological Sciences,
University of California,
Berkeley, California 94720

(Contains rev. chapt. on Handling, Transportation, and Storage of Pesticides, issued 1976)

Part I discusses thoroughly such topics as: 1) pesticide development, regulation, formulations, and containers; 2) handling, transportation, and storage, including hazards in movement and

pesticide stability; 3) disposal of used pesticide containers and surplus pesticides; 4) pesticide application equipment; 5) human safety; 6) judicious use of pesticides; 7) monitoring pesticide residues in food and in the environment; and 8) important pest problems and pesticides in tropical and subtropical countries, including land use, crops, livestock, insects and diseases, pesticides used for their control, nematodes, weeds and the use of herbicides on tropical and subtropical crops, livestock insects, and pest resistance to pesticides. This manual was written as an aid to evaluating contemplated pesticide uses in programs for developing countries and ensuring the safe and efficient use of pesticides. Because the knowledge of pesticide handling and use is limited, only existing information, naturally, can be offered. The manual, however, is not to be regarded as a "how-to-do" instruction book, but rather as an overview of all the known aspects of pesticides, with emphasis on hazards and unknowns.

PN-AAB-811

\$13.85

PESTICIDE MANUAL, PT. 2: BASIC INFORMATION ON THIRTY-FIVE PESTICIDE CHEMICALS

Von Ruemker, Rosemarie; Horay, Freda
1972, 205p. (632.95.R936)

Department of Entomological Sciences
University of California
Berkeley, California 94720

Part II of the *Pesticide Manual* treats thirty-five pesticide chemicals. Outlined, with pertinent charts and tables, are their identity, physical and chemical properties, analytical methods, hazards to humans, hazards to the environment, and pesticidal effectiveness. The chemicals covered are: 1) Herbicides - Alachlor; Propanil; Trifluralin; Dalapon-NA; MGPA; 2,4-D; 2,4,5-T; 2) Insecticides - (organic phosphates and carbamates) - Garbaryl; Malathion; Naled; Dimethoate; Fenthion; Diazinon; Ethion; Oxydemeton-methyl; Azinphos-methyl; Phosphamidon; Mevinphos; Methyl-parathion; Parathion (chlorinated hydrocarbons) - DDTG; BHC; Chlordane; Heptachlor; Toxaphene; Aldrin; Dieldrin; Endrin; 3) Fungicides-Captan; Benomyl; Zineb; Maneb; Mancozeb 4) Fumigant; Methyl bromide; and 5) Rodenticide-Zinc phosphide. A pesticides cross-reference index and an index of trade names and common names are included.

PN-AAB-812

\$16.40

PESTICIDE MANUAL, PT. 3: SPECIFICATIONS

Von Ruemker, Rosemarie; Horay, Freda
1972, 261p. (632.95.R936)

Department of Entomological Sciences
University of California
Berkeley, California 94720

Part III provides three types of specifications for the thirty-five pesticide chemicals detailed in Part II. They are: 1) FAO (Food and Agriculture Organization of the United Nations) Specification; 2) Provisional Specification (developed and to be published by FAO) with an FAO code number in the title; and 3) Provisional Specification (developed by AID and in the FAO format) without a code number. The specifications include the following physical and chemical properties: description, active ingredient, impurities, physical properties, storage stability, and containers. Each pesticide is discussed in outline form.

PN-AAB-813

\$20.90

Please use the publication number in ordering.
Example: PN-AAB-000

DIPHENADIONE RESIDUES IN TISSUES OF CATTLE

Bullard, R.W.; Thompson, R.D.; Holguin, Gilbert
1976, 3p.

United States Fish and Wildlife Service
Wildlife Research Center
Federal Center, Denver, Colorado 80225

(In Agricultural and Food Chemistry, V. 24, No. 2, p. 261-263)

Blood and tissue of cattle were tested for residues of diphenadione (2-(diphenylacetyl)-1,3-indandione), an anticoagulant livestock systemic intended for use in vampire bat (*Desmodus rotundus*) control. Liver and kidney samples from heifers given single 1 mg/kg intraruminal injections, contained 0.15 ppm or less up to 90 days post-treatment. Detectable levels (>0.01 ppm) could not be found by gas-liquid chromatography in blood, brain, heart, fat, and muscle tissue samples taken at 30, 60, and 90 days post-treatment. Adult Sprague Dawley rats were fed the liver from test cattle in a 14-day secondary hazard feeding study. No rats died; treated and control rats did not differ in prothrombin clotting time, and diphenadione was not detected in the liver or blood of treated rats. Calculations based on residue levels in this study indicate that humans may safely eat the meat, including liver and kidney, of treated cattle.

PN-AAB-941 \$2.00

SOILS

RELATIONSHIP OF FLUORIDE REACTIVE SOIL ALUMINUM TO PLANT GROWTH IN CERRADO SOILS OF BRAZIL

Stilwell, T.C.
1975, 87p.

Agronomy Department
Ohio State University
Columbus, Ohio 43210

(Doctoral dissertation-Ohio State University)

This study involved two distinct subject matter areas, one the study of soil aluminum and the other the Cerrado areas of central Brazil. The materials used in the study were soil samples taken from selected sites in the Cerrado in September 1973, but the actual laboratory work and growth of plants were done at Ohio State University. The Cerrado area is of interest as having great agricultural potential, though currently this area is little used for intensive agriculture. Some attempts at utilizing it have failed and after several preliminary studies of the native vegetation and field trials, the initial results lean toward native soil aluminum as the major problem. Thus, aluminum-tolerant varieties of field crops are being sought as possible solutions to the problems. Because of the problem with aluminum in these soils, the second area of study involved an attempt to characterize the phytotoxic aluminum in some representative soils of Cerrado regions. Extraction of soil samples with 1N KCl, a traditional method, and a modified F-titration procedure, a new technique, were used to estimate the level of phytotoxic aluminum in these soils. These methods then were correlated with plant growth on the soil samples.

PN-AAB-886 \$7.00

PROPERTIES OF SOME SOILS OF THE UPPER AMAZON BASIN OF PERU

Sanchez, P.A.; Buol, S.W.
1974, 6p.

Soil Science Department
North Carolina State University
Raleigh, North Carolina 27607

(In Soil Science Society of America Proceedings, V. 38, No. 1, p. 117-121)

Several representative soil profiles of the Peruvian Amazon jungle were collected in the vicinity of Yurimaguas and Iquitos and characterized in the laboratory in order to classify them according to the U.S. soil taxonomic system. The most extensive well-drained soils are Typic Paleudults; the poorly-drained ones are Typic Tropaqualls or Tropaquepts. The Paleudults were predominantly of kaolinitic mineralogy with small quantities of 2:1 minerals present. The poorly-drained soils were predominantly montmorillonitic or of mixed mineralogy. Where coarse-textured parent materials occur in localized areas, Tropaquods and Haploorthods are found. High base status Haploquolls are found along the margins of the Amazon and Napo Rivers. The base status of the Paleudults is not as low as in the main soils of the South American savannas. The base status of the more poorly-drained soils is higher. Evidence from surrounding countries suggests that these soils are very extensive in the Upper Amazon Basin of South America, outside the influence of the Brazilian and Guayana shields. These areas have been mapped previously as Oxisols or their equivalents.

PN-AAB-927 \$2.00

SULFATE ADSORPTION BY SOME SOILS OF THE TROPICS

Couto, Walter
1976, 92p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(Doctoral dissertation - Cornell)

Sulfate adsorption of surface and subsoil samples of two Oxisols and one Alfisol from Brazil was estimated by equilibration with solutions containing increasing amounts of sulfate as K₂SO₄ and 20 mM KCl/1 as supporting electrolyte. The amount absorbed was estimated from sulfate remaining in solution after shaking for 24 hours. The results were expressed according to the Langmuir equation but were better described by an empirical model. The pH of the equilibrium solution increased at increasing levels of adsorbed sulfate. Sulfate adsorption at several constant pH values was estimated from the regression equation and showed a clear pH dependence of sulfate adsorption. There were large differences also between the amounts of sulfate adsorbed in the surface and subsoil for a given soil, due probably to the difference in organic matter content. In a separate study sulfate desorption by 0.5 N, NH₄NO₃ was measured after equilibration with solutions containing 0, 1.2, and 2.4 mM SO₄ per liter. For some samples almost all absorbed sulfate was desorbed while for other samples only a fraction of absorbed sulfate was desorbed. Increased sulfate absorption resulted in increased cation retention capacity of the soils as measured by K⁺ adsorption and desorption.

PN-AAC-207 \$7.40

EFFECT OF 5 LEVELS AND 3 SOURCES OF N ON SWEETPOTATO YIELDS ON AN ULTISOL

Talleyrand, H.; Lugo-Lopez, M.A.
1976, 6p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(In Journal of agriculture of the University of Puerto Rico, V. 60, No. 1, p. 9-14)

The effect of N levels and sources on sweetpotatoes (*Ipomoea batatas*) was investigated on an Ultisol in the central, hilly, interior region of Puerto Rico at about 450m above sea level.

AGRICULTURE

Treatment differentials were: Broadcast, preplant applications of 0, 10, 20, 40, and 50 kg/ha of N from urea and 40 kg/ha of N from two sulfur-coated urea compounds (slow-releasing N sources) containing 39.6 and 37%N in each case. The soil had a pH of 4.7 in the top 25 cm of the profile but it apparently supplied enough Ca for a sweetpotato crop. There was no evidence of Al injury to the crop even though exchangeable Al levels were high, i.e. more than 50% of the sum of cations in the 25-50 cm layer. Maximum marketable yields were 14.6 tons/ha (130 cwt/acre). These were obtained with the application of 40 kg/ha (35.6 lb/A) of N as ordinary urea. Evidently, there was no advantage in using slow-releasing N sources. In fact, a slight yield depression was observed. The Capo fertilizer-yield equation was applied to the mean yield data obtained from the urea treatments, and a coefficient of determination of 0.99 was obtained. This equation appeared to be useful in predicting sweetpotato yields in terms of the N fertilizer applied in this experiment.

PN-AAC-209 \$2.00

THE SIGNIFICANCE OF KC1-EXTRACTABLE AL (III) AS AN INDEX TO LIME REQUIREMENT OF SOILS OF THE HUMID TROPICS

Amedee, Gaston; Peech, Michael
1976, 7p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(In Soil science, V. 121, No. 4, p. 227-233)

The significance of KC1-extractable Al(III) in acid soils of the humid tropics for determining lime requirement was evaluated by comparing the amounts of Al(III) extracted with 0.1 N KC1. The cumulative amounts of Al(III) removed upon successive extractions of the soils with 1 N KC1 were found to be greater than those removed by exhaustive successive extractions with 0.1 N KC1. This could, in part, be attributed to the release of H⁺, owing to the increase of the surface negative charge in the presence of the higher electrolyte concentration at pH values above the zero point of charge, which in turn would be expected to result in an equivalent amount of KC1-extractable Al(III). The value of (pH-1/3 pAl) for the first and subsequent 0.1 N KC1 extracts was found to remain remarkably constant and nearly equal to 2.8, corresponding to the solubility of gibbsite. This would indicate that the concentration of Al(III) on 0.1 N and 1 N KC1 extracts was determined by the solubility of precipitated Al(OH)₃ originally present in the soil. Gibbsite was found to be virtually insoluble in 1N KC1 at pH values above 4. The significant conclusion that may be drawn is that the amount of Al(III) extracted by 1 N KC1 does not represent the intrinsic property of the acid soils of the humid tropics.

PN-AAC-210 \$2.00

QUARTZ PRESENCE IN RELATIONSHIP TO GIBBSITE STABILITY IN SOME HIGHLY WEATHERED SOILS OF BRAZIL

Weaver, R.M.
1975, 6p.

Department of Agronomy
Cornell University
Ithaca, New York 14853

(In Clays and clay minerals, V. 23, p. 431-436)

Analysis of the mineralogical composition of six highly weathered soils of the Central Plateau of Brazil showed that the sand content (predominantly quartz) was not related to the relative amounts of gibbsite and kaolinite in the clay (<2 μ m) fractions. The latter is in agreement with kinetic considerations of the

involved mineral species, but in disagreement with the thermodynamic considerations. However, that dissolution of quartz has been operative in these soils is indicated by an excellent relationship ($r_2 = 0.96$) between the amount of sand-size quartz and the reactive SiO₂ content of the clay fractions.

PN-AAC-211 \$2.00

LATERITE AND LATERITIC SOILS AND OTHER PROBLEM SOILS OF THE TROPICS; AN ENGINEERING EVALUATION AND HIGHWAY DESIGN STUDY, VOLUME 1

Morin, W.J.; Todor, P.C.
1976, 378p.

Lyon Associates Inc., Baltimore, Maryland

Copies are available free from John Zedalis, SER/ENGR, Room 509 SA-11, Agency for International Development, Washington, D.C. 20523

The results of a three-phase, eight-year study of how lateritic and other problem soils in Asia, Africa, and South America can be effectively used in roadbuilding. Phase I of the study, conducted in 1967-1972, was based in Ghana. Phase III, 1972 to 1975, was based in Brazil. The report presents the following five types of information useful for engineers concerned with building highways, airfields dams, and other earthen structures in tropical countries: (1) A comprehensive description of tropical soils, including their chemical, mineralogical, and physical properties, and their engineering behaviors; (2) A new pavement design procedure developed in the tropics for tropical applications; (3) A practical range of strength values attainable by stabilizing tropical soils; (4) Specifications for common tropical materials used in highway construction; and (5) Methods of working with and using problem soils, such as black clay and volcanic soils. A separate volume of this report (Volume II) is a technical manual designed to be used by field engineers and technicians as a guide in the engineering evaluation of tropical soils and in the design of flexible pavements in the tropics.

PN-AAC-065 \$30.25

WATER MANAGEMENT

CALIBRATION AND APPLICATION OF THE JENSEN-HAISE EVAPOTRANSPIRATION EQUATION

Clyma, Wayne; Chaudhary, M.R.
1975, 20p.

Engineering Research Center
Colorado State University
Fort Collins, Colorado 80521

(In Water Management Technical Report No. 40)
(In Pakistan field report No. 4)

A summary of the procedure for determining evapotranspiration after calibrating the Jensen-Haise equation is as follows: 1. Determine mean daily temperature (T) from daily maximum and minimum temperatures for the season and region under consideration. 2. Convert the corresponding radiation values to equivalent depth of evapotranspiration in inches/day (Rs) using the relation Langley's/day X 0.000673 = inches/day. 3. Substitute the values of T and Rs in the equation, calibrated for that region and compute potential evapotranspiration, Etp. 4. Actual evapotranspiration Et can be obtained by combining Etp with Kc in equation. Just after planting, since plants have very poor cover, Et is much less than Etp. However, the two values tend to approach each other as the crop grows and after about the third of February, when plants are assumed to have attained full effective cover and Kc approaches 1, Et, and Etp are near the same until maturation begins. During maturation the two curves di-

verge since Et reduces because of lessened photosynthetic activity and/or a limited supply of water.

PN-AAB-926 \$2.00

WATER LIFTERS AND PUMPS FOR THE DEVELOPING WORLD

Wood, A.D.
1976, 316p.

Department of Civil Engineering
Colorado State University
Fort Collins, Colorado 80521

(Master Thesis—Colorado State)

This extensive review of the current state-of-the-art of water-lifting technology is intended to serve as a reference point for future research designed to (a) improve efficiencies of existing water-lifting devices; (b) develop designs suited for manufacture, operation, and maintenance in developing countries; and (c) adapt existing devices that can be used with natural prime movers, in light of recent energy shortages. First discussed is the history of water-lifting devices, followed by descriptions of various methods (reciprocating, rotary, kinetic) and applications of those methods. The prime movers are categorized as manual, animal, and natural (wind, water, sun, and geothermal heat). A detailed and heavily illustrated section on windmills discusses five different types of windmills and the various types of transmissions used with them to supply power to many kinds of water lifters: the screw, paddle wheel, noria, tympanum, Persian wheel, water ladder, chain pump, diaphragm pump, bucket pump, and rotary or rotodynamic pump. Also discussed in detail are watermill applications, in which the force of water current in a canal or stream is used to lift water. Those watermills include the float mill, Poncelet, breast, overshot, Pelton wheel, Mitchell turbine, and tangent wheel. The selection of the best water lifter and prime movers for a given situation is discussed in terms of three major factors: availability and adaptability, water requirements, and cost of construction and maintenance. Sample cost analyses are provided for several types of water-lifting operations. In the concluding section, the author discusses means by which methods in developing countries can be improved without making them dependent on imported parts or fuel for maintenance and operation.

PN-AAC-116 \$25.30

ECONOMICS

GENERAL ECONOMICS

IS HUMAN CAPITAL AN IMPORTANT DETERMINANT OF EARNINGS IN SMALL MANUFACTURING AND RETAIL FIRMS IN INDIA?

Shortlidge, R.L.
1976, 19p.

Department of Agricultural Economics
Cornell University
Ithaca, New York 14850

(In Occasional paper No. 85)

This study focuses on the role of human capital as a determinant of earnings for workers employed in small-scale manufacturing, wholesale, and retail firms in India. The human capital variables are education, firm-specific experience, occupation-specific experience, and general experience. The study yields six major conclusions. First, there is a threshold minimum level of education above which education leads to increases in earnings. Second, there are strong complements between education and years

of both firm-specific and general experience. Third, while there are increasing returns to education, there are diminishing returns to general experience. Fourth, the elasticity of substitution between general experience and firm-specific experience was constant for all levels of education. Fifth, rapid agricultural development appears to affect positively wages in the on-agricultural sector. Sixth, there appear to be economies of scale among firms in the retail and wholesale trades in India.

PN-AAB-816 \$2.00

STRUCTURAL CHANGES IN THE TURKISH ECONOMY: 1962-1967

Kayir, S.F.; Checkley, J.L.
1974, 28p.

Department of Economics
Iowa State University
Ames, Iowa 50010

(In Occasional Paper No. 8)

An analysis of the structural changes that took place in Turkey during the First Five-Year Plan period, 1962-1967. The authors used the 1963 and 1967 interindustry transaction tables of Turkey to determine changes that took place in the Turkish economy. The basic objective of the Plan was to increase the relative importance of the industrial sector, and to reduce the heavy dependence of agriculture on weather conditions. In practice, however, emphasis was placed on the industrial objective. The analysis showed that the production structure of Turkey did not change significantly during the five-year period. The production structure remained oriented to the first transformation of primary goods. The economy has remained dominated by the primary and services blocks, and the use of energy in the economy has remained very limited. No significant improvements have been recorded in the integration of sectors within many of the blocks. Finally, the dependence on imports has increased. The results of the I-O analysis suggest that key sectors were neglected and the relations of various sector were not fully understood. For example, the chemicals sector has strong impacts on many other sectors, yet large investment projects for this sector were delayed. The study illustrates how block triangulation can contribute to the development planning by highlighting the key sectors connecting different blocks and the key relations linking sectors within a given block.

PN-AAB-897 \$2.25

CHANGES IN THE COMPOSITION OF CAPITAL, EMPLOYMENT, VALUE ADDED, AND PRODUCTION IN VARIOUS INDUSTRY GROUPS, INDIA, 1951-1965

Dabholkar, Uttam; Goldsmith, Arthur
1975, 30p.

Department of Agricultural Economics
Warren Hall, Cornell University
Ithaca, New York 14850

(In Occasional paper No. 84)

Recently, social analysts and policymakers have exhibited increased interest in employment-oriented development strategies for the Third World. Past attempts at development have tended to neglect industries using a high labor input, including most consumer goods industries, while favoring investment in capital-intensive industries such as steel and heavy machinery. Because of the recent interest in accelerated employment growth and the development of labor-intensive industries, an examination of the relevant statistics in India is instructive. Tables 1 through 6 of this report present data on employment, capital, and output in registered (large and medium) Indian industries in 1951, 1957, 1961, and 1965. The smaller or unregistered firms, which

ECONOMICS

contribute perhaps one-third of India's industrial products, are excluded due to lack of data. Following Tables I through 6 is a discussion of potential employment levels in the reference years, the causes of net potential job loss, and some of the policy implications of those findings.

PN-AAB-931 \$2.40

OPTIMIZATION RULES FOR PRODUCER GROUPS IN A STOCHASTIC MARKET SETTING, WITH APPLICATION TO THE COPPER AND TEA MARKETS

Underwood, J.M.
1975, 17p.

Department of Agriculture and Applied Economics
University of Minnesota
St. Paul, Minnesota 55108

The success of the Organization of Petroleum Exporting Countries (OPEC) has generated much discussion and controversy about the possibility of other international primary commodity producer cartels. This study develops a framework within which to measure, at least to a first approximation, the expected return to a primary commodity producer cartel and actually to calculate, within this framework, the expected return to various proposed cartels. A partial adjustment model was used which results in supply equations in which current supply depends on the current real price and once-lagged endogenous variables and autocorrelated error terms. A demand for private stocks equation also is estimated. Results show that for a tea cartel consisting of India, Sri Lanka, and the main East African tea producers, the gain seems large enough and the number of countries small enough, it might succeed. But for copper cartel consisting of all primary copper-producing countries except the United States and Canada, there does not appear to be a large enough return to justify its formation.

PN-AAB-935 \$2.00

GROWTH AND DEVELOPMENTAL EFFECTS OF FOOD SHIPMENTS UNDER PUBLIC LAW 480; FINAL REPORT

Mayer, L.V.; Heady, E.O.
Iowa State University
Center for Agricultural and Rural Development
1972, 133p.

Center for Agricultural and Rural Development
Iowa State University
Ames, Iowa 50010

(Research summary)

An analysis of various considerations involved in food aid. The report begins with an overview of the elimination of world hunger. The next chapter studies the establishment of sales terms and payment conditions for food aid. Here it is seen that while the U.S. relies upon a policy of using all its institutionalized land resources for either crop production or government-supported land retirement, the appropriate level of cost for P.L. 480 products is considerably below gross Commodity Credit Corporation (CCC) costs. Given continued extensions of annual land retirement programs, objectives of and pricing for food aid programs should be re-evaluated. The report continues with a re-examination of the impact of food aid, and it is shown that food aid can be utilized without adverse effects on the incentives of domestic producers in recipient countries if proper distribution methods are adopted to shift the demand curve simultaneously with the shift in supply. The report concludes with a chapter on achieving economic development through food aid. The unprecedented increases in agricultural output have brought about a grain balance in food aid recipient countries at the existing level of development programs. But to achieve economic growth through food aid, either massive food distribution programs must

be established or employment opportunities through rural works programs must be created. Both options are examined here.

PN-AAC-034 \$?.??

AN ANALYSIS OF COSTS INCURRED AND PRICES CHARGED FOR FOOD SHIPMENTS UNDER PUBLIC LAW 480

Mayer, L.V.
1970, 76p.

Center for Agricultural and Economic Development
Iowa State University
Ames, Iowa 50010

(In Developmental Series report No. 2)

A measurement of the public costs of programs relating to domestic agriculture when outlays are for varying levels and mixes of land retirement and publicly assisted exports, and when supply control is implemented through different types of land retirement programs. Also given are potential costs at which food could be provided to recipient countries under different levels of P.L. 480 exports and various choices in types of land retirement programs. It is felt that the choice may not be between 1) a land retirement program and P.L. 480 shipments of the magnitude over the past decade, or 2) a land retirement program of this magnitude and no P.L. 480 shipments. Rather, it may be a choice between the first and a larger land retirement program to offset cessation of publicly assisted food exports and to maintain prices. Under the latter set of choices, the public costs of food aid then may be marginal; since part of all of the funds to support this international activity might (or would) be needed for larger land retirement and supply control programs. The results of study indicate the need for further analysis of inter-relationships in domestic farm programs, food aid, and public costs.

PN-AAC-035 \$6.10

SAVINGS BEHAVIOR OF POOR AND RICH IN TAIWAN—1964, 1966, 1968, and 1970

Krzyzaniak, Marian
1976, 32p.

Program of Development Studies
Rice University
Houston, Texas 77001

(In Program of development studies. Paper No. 73)

Cross-sectional data on consumption (savings) by income brackets appear to suggest that rich and poor exhibit different marginal propensities to consume (save). Perhaps the traditional concept of savings-investments should be changed to include consumer durables because poor have different access to savings instruments; or the above inference is a misreading of evidence. The paper shows the latter to hold. The information on such propensities is highly relevant for theories of economic growth and development. Economists lately have stressed wide sharing of gains from such a development as a precondition of it. Given the needs of new capital formation, a too-egalitarian redistribution would force such nations to sell their resources to foreign capital or to forego development.

PN-AAC-169 \$2.60

Please use the publication number in ordering.
Example: PN-AAB-000

AGRICULTURAL ECONOMICS**PRODUCTION COSTS AND RETURNS FOR MAJOR AGRICULTURAL PRODUCTS OF NICARAGUA: DATA TABLES FOR 1972 and 1975**

Warnken, P.F.
1975, 77p.

Department of Agricultural Economics
University of Missouri
Columbia, Missouri 65201

The 1975 figures for cost and return essentially are an updating of previously reported 1972 data using input and output prices of January 1975. This approach assumes: 1) no significant changes in technology between 1972 and 1975; 2) no major changes in on-farm use of inputs resulting from input and/or output price changes; and 3) price changes were representative for the sample farms analyzed. No attempt was made to analyze the impact of price changes on the various economic and production variables. However, direct comparisons can be made by referring to the data for 1972 and 1975. Tables for both years have been included in this report.

PN-AAB-680

\$6.20

REGIONAL DIFFERENCES IN AGRICULTURAL PRODUCTIVITY IN SELECTED AREAS OF INDIA

Easter, K.W.; Abel, M.E.; Norton, George
1976, 39p.

Department of Agricultural and Applied Economics
University of Minnesota
St. Paul, Minnesota 55108

(In Staff paper P76-12)

This analysis measures, using production functions, the contribution to total output of not only the quantity of traditional inputs (land, labor, fertilizer, etc.) but also the quality of certain inputs, particularly irrigation; technology; environmental factors (soil types, rainfall, etc.); and infrastructure (transportation, markets, etc.). Identification and measurement of the contribution to output of different types of inputs together with assessments of their supply provide valuable insights into the direction that agricultural development should take in different regions of a country. Two regions in India are studied, the so-called Wheat Region and the Eastern Rice Region. Data cover a ten-year period, 1959-60 through 1968-69, for all the districts for value of crop output, crop area, irrigation, and fertilizer. Data for tractors and labor are obtained for the ten-year period by interpolating and extrapolating trends based on two census years. A three-stage procedure to improve the specification of the estimated production functions is used. The first stage estimates production functions from the time series of cross-section data using an error components model. The second explains variations in regional effects by several factors not included in the original production function. Finally, the original production functions are respecified to include these additional factors and then reestimated for time periods when data on more of the relevant variables are available.

PN-AAB-690

\$3.15

BENEFIT-COST ANALYSIS OF SURFACED ROADS IN THE EASTERN RICE REGION OF INDIA

Spriggs, John
1976, 13p.

Department of Agricultural and Applied Economics
University of Minnesota
St. Paul, Minnesota 55108

(In Staff paper P76-13)

K.W. Easter, M. Abel, and G. Norton in *Regional Differences in Agricultural Productivity in Selected Areas of India* (March 1976) measured the contribution of various inputs to total output in the Eastern Rice Region (ERR) of India. This research uses their estimated production elasticity on surfaced roads in figuring a benefit-cost measure of public investment in surfaced roads in the ERR. First a model was set up to calculate the benefits and then the costs, and finally they were joined in a benefit-cost ratio. Although the calculations are not precise because of the lack of information, errors, if any, are made on the side tending to lower the ratio of benefits to costs. Despite this, the results indicate that increasing surfaced road density in the ERR has a high payoff.

PN-AAB-705

\$2.00

EFFECTS OF TECHNOLOGICAL CHANGE ON OUTPUT, EMPLOYMENT, AND FUNCTIONAL INCOME DISTRIBUTION IN INDIAN AGRICULTURE: A CASE STUDY OF THE PUNJAB WHEAT ECONOMY

Bisaliah, Siddanaik
1975, 234p.

Department of Agricultural and Applied Economics
University of Minnesota
St. Paul, Minnesota 55108

(Dissertation - University of Minnesota)

The main objective of this study was a quantitative assessment of various issues using farm-level primary cross-section data; specifically the goals were: 1) to decompose total difference in per acre output between farms employing new technology and those employing old, into two broad forces, technological change and change in the volume of (complementary) inputs; 2) to determine employment elasticities with respect to certain key economic variables; 3) to decompose total difference in per acre employment with the introduction of Mexican wheat into relevant forces — technical change, output change, change in input prices and input quantities; and 4) to determine the direction and magnitude of changes in functional income distribution. For empirical implementation of these objectives, interrelated economic models based on the neoclassical theory of production and distribution were used. Conclusions are outlined as follows: 1) The measured contribution of technology to output growth demonstrates the importance of technical change to growth; 2) The 25% contribution of increased inputs to total change in output indicates a structural transformation in the form of increased dependence of agriculture on off-farm inputs; 3) Employment elasticities with respect to money wage rate, rental value of land, price of fertilizer, and output are estimated to be the same under old and new technology; 4) The forces affecting employment are technological progress, variations in output, and relative factor prices. Of these, perhaps output is the variable most susceptible to control at various policy levels; 5) Employment elasticity with respect to normalized wage rate, land, and fertilizer between old and new production technology may be concluded to be not significantly different; 6) The use of output is suggested as an instrument variable for creation of employment; 7) The effect of new technology or income distribution is debated and discussed.

PN-AAB-708

\$18.75

PANAMA'S ECONOMIC DEVELOPMENT: THE ROLE OF AGRICULTURE

Merrill, W.C.; Fletcher, L.B.; Hoffman, R.A.; Applegate, M.J.
1975, 230p.

Department of Economics
Iowa State University
Ames, Iowa 50010

The study of Panama's agricultural development was carried out

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in three stages, of which the third is reported here. The first stage was to collect and evaluate all available data related to Panama's agricultural development: agricultural production, marketing, resource availability, and price policies. This provided a general overview and helped to identify areas in which additional data and research were needed. Second, various government agencies and international organizations were asked to assist in this research. Most of the studies prepared in this second phase were treated as working documents and were not distributed widely; nevertheless, these reports represent the major component of the agricultural study. The goal of the third and final phase was to summarize the reports from the second phase and to relate their various program proposals, recommendations, and information to the general agricultural situation. It was concluded that the Panamanian Government must recognize the role that agricultural development plays in promoting the growth of non-agricultural sectors of the economy. Agricultural research must be continuous and increasing in scale. Both new technology and agricultural credit must be widely and easily available, and agricultural education must be expanded.

PN-AAB-724

\$18.40

THE INTERACTION OF GROWTH STRATEGY, AGRICULTURE AND FOREIGN TRADE: THE CASE OF INDIA

Mellor, J.W.; Lele, U.J.
1974, 24p.

Department of Agricultural Economics
Cornell University
Ithaca, New York 14850

(In Occasional paper No. 74)

In the relationship between agriculture and trade in economic development, agriculture usually is seen as providing exports to earn the foreign exchange requisite to industrial growth. But in contrast to this passive role for agriculture, this study depicts a relationship among agriculture, trade, and growth in which development of the agricultural sector plays a basic role as a determinant of the strategy of growth, with profound implications for over-all growth rates and the pace and pattern on industrial growth, and thereby becomes a major determinant of the volume and composition of foreign trade. This report briefly contrasts strategies of growth with divergent roles for agriculture and trade, and then within that context analyzes the pattern of imports and exports for India. It is argued that the capital-intensive industrial strategy, so much in the ascendancy in the recent past in India specifically and in the literature of economic development generally, inevitably was associated with slow growth in agriculture, in employment, and in trade. And conversely, an increased rate of employment growth, now of so much policy concern, requires complementary change in agricultural and trade policies and in planning procedures.

PN-AAB-814

\$2.00

THE PROCESS AND POTENTIALS OF MODERNIZING AGRICULTURE

Brown, D.W.
1971, 12p.

Department of Agricultural Economics
and Rural Sociology
University of Tennessee
Knoxville, Tennessee 37901

A discussion of several key dimensions to be kept in mind if efforts to modernize a nation's agriculture are to succeed. The nine key points: (1) The best form of agricultural modernization depends on the ultimate goal, whether this is to make cheaper food available or compete in world trade, or help campesinos

raise their income, or increase employment opportunities in agriculture so as to reduce migration to the cities. (2) Laws, plans, and funds in themselves do nothing; they must be translated into effective programs; people in agriculture must be aware, capable and motivated. (3) Agricultural modernization is a continuing, changing process, requiring constant assessment of problems and the effectiveness of initial programs. (4) Special provision may be needed to help farmers absorb setbacks beyond their control. (5) Effective planning of agricultural modernization involves choosing from among alternatives and establishing priorities. (6) Attention to details can make the difference between program success and failure (i.e., assuring the supply of fertilizer, tractor spare parts, storage facilities, and providing for "slippage" time in program implementations. (7) Don't forget the "unsung heroes" of agricultural progress, i.e., enforcement of grades and standards, tax administration, market information, collection of statistics, weather forecasting, seed certification, regulation of water use, animal health services, soil testing, and other low-visibility factors. (8) There are no universal answers; innovations most feasible and acceptable differ from place to place. (9) Agricultural modernization is increasingly interdependent with other sectors and policies involving transportation systems, price stabilization, international agreements, taxation, industrial development, etc., and also dependent on the motivation of producers, agency personnel, and government leaders. When agency officials consider any particular proposal, they need to be alert to alternatives that may be more effective. They need to consider what self-sustaining changes are actually likely to occur in future as a result of the proposed action. And they must keep in mind that goals, constraints, and human responses may make the best answer for one situation different from that in another.

PN-AAB-843

\$2.00

ANALYSIS OF CAPITAL FORMATION AND UTILIZATION IN LESS DEVELOPED COUNTRIES; TERMINAL REPORT

Ohio State University
Department of Agricultural Economics
and Rural Sociology
1969, 130p.

Department of Agricultural Economics
and Rural Sociology
Ohio State University
Columbus, Ohio 43210

(Research summary, 1968-1969)

(In Economics and sociology occasional paper No. 4)

An analysis of the productivities of various forms of capital resources at the farm level. Basic data collected concerning the 1965 farm operations of 821 farmers in Rio Grande do Sul and Santa Catarina, Brazil, were analyzed to determine: (1) how capital resources were being used on the farms; (2) the productivities attributable to the use of those capital resources; (3) variations in resource allocation and productivities among farms with different characteristics; and (4) specific policy implications of the findings. Among the authors' findings and conclusions: The results of the analysis demonstrate rather conclusively that agricultural activity is so diversely organized that broad generalizations are not very useful as policy guides. Possibilities for improving productivity in southern Brazil have been overlooked partly because of lack of understanding of the potentials existing in various types of farm operations. The following findings are discussed in detail: Farm operations. The following findings are discussed in detail: Farm operations with 20 to 30 hectares of productive land, using draft animal power, make relatively full use of available land, labor, and capital resources. Farms with less than 20 hectares of productive land do not adequately use the available family labor resource unless the farm is engaged in a specialized labor-intensive enterprise.

Farms with more than 30 hectares either have a lower percentage of total area cultivated or have additional capital investments for power sources. With all types of farms, the larger the farm size, the more the average returns diminish in terms of yield per hectare. Crop farms and especially mechanized crop farms are making greater use of profitable new crop inputs and credit than are livestock farms. Farms with less than ten hectares of productive land are not generating sufficient income to meet annual production, consumption, and investment needs. The change from traditional livestock farming to mechanized crop farms has resulted in a sixfold increase in gross output. Unlike what might be expected, the quantity of labor used on mechanized crop farms, in comparison with livestock farms, is 50 per cent greater. The level of credit use on mechanized crop farms is ten times greater on traditional livestock farms. Crop expenses per hectare are 2.5 to 8 times greater on mechanized crop farms than on non-mechanized small farms. Amounts of credit used for purchasing these inputs are 8 to 20 times greater on mechanized crop farms. Management performance is a strong indicator of level of productivity. Managers rate higher on livestock practices than on crop practices.

PN-AAB-867

\$10.40

AN ANALYSIS OF AGRICULTURAL DEVELOPMENT PROBLEMS AT THE FARM LEVEL, SOUTHERN BRAZIL: METHODOLOGY AND GENERAL FARM DESCRIPTION

Rask, Norman
1968, 75p.

Department of Agricultural Economics
and Rural Sociology
Ohio State University
Columbus, Ohio 43210

(In AFC research report 120)

The methodology of a study designed to analyze agricultural development problems at the farm level in southern Brazil. The research areas include: (1) the role of capital in agricultural development; (2) the relationship of type of farm and farm size to labor and power requirements on farms; and (3) the relationship of management level to capital use intensity and productivity. Descriptive data on 954 farms representing a cross-section of types of farming regions in southern Brazil are presented in this report. The data show that individual farms vary widely in several characteristics. Farm sizes range from a few hectares to several thousands of hectares. Technology levels on neighboring farms may vary from hand methods to the most modern of mechanized power units. Differences in the level of use of other forms of technology are equally apparent. Market orientation varies from subsistence-oriented farming to highly commercialized agricultural production units. Farm investment and income patterns show similar differences. External sources of capital used by farm operators are principally government oriented. This indicates a dependence of farmers on government for investment capital. Thus government may be able to introduce desired changes in the capital structure of agriculture. However, the fact that government credit is closely tied to subsidized interest rates may indicate a general lack of profitability of additional capital in agriculture.

PN-AAB-868

\$6.00

GUATEMALA'S ECONOMIC DEVELOPMENT: THE ROLE OF AGRICULTURE

Fletcher, L.B.; Graber, E.S.; Merrill, W.C.; Thorbecke, Erik
1970, 221p.

Department of Economics
Iowa State University
Ames, Iowa 50010

A study of the role of agriculture in the economic development of Guatemala, which suggests short- and medium-term policies conducive to economic development. The analysis is based on the assumption that no major land reform program could occur during the early 1970s. The nine chapters of this book discuss Guatemalan geography and population; structure and performance of the Guatemalan economy; the role of agriculture in the economy; structure of the agricultural sector; supply and demand projections for basic foods; government policies and programs; improving grain marketing, marketing of basic foods; and alternative policies and programs. Among the conclusions and recommendations in the last chapter are the following: The Guatemalan government should give the highest priority to improving the productivity of land and labor resources in the agricultural sector. Programs designed to achieve this goal should emphasize increases in rural employment and improvements in income distribution as well as increased output. Producing more per hectare and more per man is the best way to reconcile the apparent conflict between output and welfare goals. The wages and housing of resident and migratory workers on large commercial farms need to be upgraded to the level of urban industrial workers. Raising yields per hectare on small farms is the best way to overcome growing underemployment and raise rural levels of living for small farmers. Programs of family planning need to be implemented as soon as possible. A major roadbuilding and improvement program should be initiated in the rural areas. Higher-yielding varieties of corn should be introduced with seed and fertilizer distributed directly to farmers as credit-in-kind. Locally adapted, production-oriented research on means of improving corn and bean production should be initiated. The government program designed for sending qualified students abroad for graduate training in agricultural development should be expanded. Government programs in the Departments of Agriculture and Economics should be provided with sufficient funds and personnel to produce more reliable and complete statistical data on agricultural production, so that existing production and marketing programs can be better identified, and the effects of new developmental programs assessed.

PN-AAB-896

\$17.70

AGRICULTURAL CREDIT

SUPERVISED CREDIT AND THE SMALL FARMER

Tinnermeier, R.L.
1971, 32p.

The Agricultural Development Council, Inc.
630 Fifth Avenue
New York, New York 10020

(Presented at Seminar on Small Farmer Development Strategies, Columbus, Ohio, 1971)

A review of the history, achievements, and limitations of Peru's supervised agricultural credit program, financed by four USAID loans totaling \$25.6 million for the period 1964 through 1970. The Peruvian supervised agricultural credit program has not been very successful in raising productivity levels, in increasing on-farm capital formation, or in improving net farm income, compared to similar programs in other countries. This is mainly because of a lack of sufficient technical assistance and a lack of sufficient water. However, other factors played a role. The program objectives were poorly defined. The target group of farmers was not well identified. Economic and welfare objectives were intermixed. Farmers with less than two hectares did not usually employ loan moneys effectively. The institutional arrangements between the supervised credit program and the state agricultural bank were inadequate. The extension agency was responsible for borrower selection and supervision, while the bank was responsible for loan collection. Each blamed the other for poor results. The extension agency should also have

ECONOMICS

been responsible for ensuring repayment of the loans, leaving the bank to handle only the loan records and accounting responsibilities. Delinquency is a major problem in Peru. Almost no rural savings have been mobilized through the supervised credit program, but the potential exists. The cooperatives are appropriate institutions for generating such savings, but unless the existing fixed low interest rates are modified, savings will have to be forced rather than obtained voluntarily. Even so, there may be considerable merit in forcing savings where this results in a more rational use of increased net farm incomes resulting from supervised credit. Aid agencies need to ensure that mistakes in Peru are not repeated elsewhere.

PN-AAB-907

\$2.60

A PROPOSED STRUCTURE FOR THE MEDIUM-TERM CREDIT PROGRAM IN THE EASTERN ORD OF UPPER VOLTA

Zalla, Tom
1976, 46p.

Department of Agricultural Economics
Michigan State University
East Lansing, Michigan 48824

A presentation of the results of a February, 1976, study of medium-term credit programs in the Eastern rural development organization of Upper Volta. The credit programs lack control. Arrears appear to be in excess of 50% of all loans given, and are on the rise. Prompt action is required to correct this situation, so that the new credit program is not compromised. Farmers with less than one hectare of cash crop are unable to make their loan payments out of increased production. The lack of an adequate veterinary care program is noted. So is the lack of equipment repair facilities in rural areas. The proposed credit program emphasizes the importance of the ability of the borrower to repay his loan. To assure this, it proposed a downpayment in kind, rather than money. The need to channel credit through groups that can provide a partial guarantee against loan losses is discussed in detail. So is the need for effective reporting and control procedures. The study urges that the ORD credit program be integrated into the national medium-term credit program proposed for the Community Development Villages by the Secretariat Permanent. Cultural and husbandry downpayments conditions are detailed for the credit program, with the understanding that those actually adopted be reconciled with the national program when its details are known. The study argues for establishment of a veterinary-care insurance fund, an equipment recycling and repair fund, a crop purchase fund, a loan loss reserve fund, and an encadreur demonstration-training program, all in support of the credit package. The recommended reporting and control procedures, says the author, will give the new credit program a good chance of achieving a 19-95% repayment rate.

PN-AAB-950

\$3.70

AGRICULTURAL MARKETING

PERFORMANCE OF PRIVATE TRADE AND COOPERATIVES

Mellor, J.W.
1975, 18p.

Department of Agricultural Economics
Cornell University
Ithaca, New York 14850

(In Occasional paper No. 87)

Recent literature with respect to private trade in marketing has resulted in a radically improved view of the competitiveness, the efficiency, and the productivity of private trade. Nevertheless, a limited place for cooperatives, other quasi-governmental agen-

cies, and the direct operation of the public sector itself still remains. However, new issues have arisen which keep the question of the appropriate balance among the various sectors in full view as an important policy issue. Discussed in this report, these include the effect of public policy and private agencies on the distribution of income; the effect on stability or instability of food supplies to urban areas and the relative stability of prices for that food; and the optimal use of scarce resources in allocation of institutional and personnel resources at the command of governments.

PN-AAB-815

\$2.00

MODERNIZING THE MARKET STRUCTURE FOR FOOD GRAINS IN TAMIL NADU, INDIA

Badenhop, M.B.
1969, 28p.

Department of Agricultural Economics
and Rural Sociology
University of Tennessee
Knoxville, Tennessee 37901

(In General Report No. 3)

India is entering the phase in which marketing and distribution are critical elements in feeding the hungry. An example of this marketing problem came with the introduction of hybrid maize into Tamil Nadu. Maize production could not realize its full potential, because market outlets were not established clearly. Too, the farmer must have a relatively high degree of assurance that there will be a satisfactory market for his crop before he plants it. With these general problems in mind, the objectives of this study were as follows: 1) to describe the present market organization and infrastructure for the food grains; 2) to determine the capacity of the present system to handle the projected increases in food grain production; 3) to outline significant changes needed to avoid serious marketing problems with state marketing and government officials. It was found that politics must be put aside when making important marketing decisions, dogma and form must be ignored in setting up new market institutions, and concentration must be on the changes required to modernize the present market structure and to build the capability in the responsible organization for making the changes deemed desirable.

PN-AAB-957

2.25

EMPLOYMENT

REGIONAL AND INDUSTRIAL CHANGES IN EMPLOYMENT IN THE PHILIPPINES, 1970-1974

Lucas, E.C.; Sereno, L.B.; Williams, T.T.
1976, 23p.

Southern University and A&M College
Post Office Box 9846
Baton Rouge, Louisiana 70813

(In Staff papers series No. 110-76)

The results of a study designed to (1) determine the magnitude and direction of employment changes among major industry groups and economic regions of the Philippines; (2) explain the causes of employment growth in terms of three broad categories of factors: the national growth component, the industrial mix growth components, and the regional share growth component. Employment data for the years 1970 and 1974, classified by major industry groups and economic regions, were used. Those years were chosen to show employment patterns two years before and two years after martial law was imposed. The study results show that substantial changes have taken place in the Philippine economy since the government embraced the concept of a mixed

economy and gave the National Economic Planning and Development Authority absolute powers to plan, implement, coordinate and regulate all programs of government agencies and private businesses. National employment has increased by 2,018,000 or 17.3%. The industries that have grown faster than the national average include Government, Agriculture, Commerce, Utilities, and Sanitation Services. Industries that have grown slower than the national average include Manufacturing, Construction, Services, Mining, and "Not Reported" industries. Why Construction and Mining lagged behind other industries is not clear. Nor is it clear whether the policies of the NEPDA have accelerated economic development. More detailed research involving less aggregated data—research on specific industries at the provincial level—is needed to assess such issues.

PN-AAC-019

\$2.00

SOCIAL SECURITY AND NATIONAL INSURANCE TRUST OF GHANA

McJulien, D.H.
1976, 15p.

Southern University and A&M College
Post Office Box 9846
Baton Rouge, Louisiana 70813

(In Staff papers series No. 107-76)

A description of the Social Security and National Insurance Trust (SSNIT) of Ghana. The basic program was introduced in 1965, and from then until 1972 was administered by the State Insurance Corporation. In 1972 the program was reorganized and expanded as the SSNIT, with a Board of Directors representing a cross-section of government officials, workers, and employers. SSNIT is similar to the British system of pension insurance schemes organized in the form of provident funds generated by compulsory savings. All employers with five or more workers must contribute to SSNIT 12.5% on wages paid. Workers pay in 5% of their wages. Farmers and other self-employed persons can pay on a voluntary basis. SSNIT benefits include retirement benefits. A member who migrates permanently from Ghana receives all contributions he has put into the fund, plus 3% interest. The 1,700 employees of SSNIT currently provide services for more than one million members. The government of Ghana borrows funds from SSNIT for use in construction of roads, schools, electrical power, and health facilities.

PN-AAC-020

\$2.00

A SURVEY OF LABOR RELATIONS IN CAMEROON

Kendrick, Robin
1976, 43p.

Center for Research on Economic Development
University of Michigan
Ann Arbor, Michigan 48108

(In Discussion paper No. 50)

Throughout most of the colonial era, Cameroonian workers, unprotected by any legal framework governing labor relations and without unions, essentially were defenseless against abuses by the Administration and private employers. Self-employment in service trades and cash-cropping for export tended to be more remunerative for Cameroonians than employment on European plantations, until after World War II. At this point, unions controlled by rival French labor federations emerged and gathered strength between the War and Independence. During this period was created the first comprehensive legal structure governing labor relations (the 1952 Labor Code), two components of which — labor inspection and resolution of disputes through arbitration

— have remained mainstays of the post-Independence legal and administrative framework governing labor relations. Following Independence, rival labor federations united on the initiative of the President, who wanted labor unions free from foreign domination and capable of providing effective support for Party-defined national goals. At the same time, a potentially important role has been given to union leaders in formulating national labor policy. The effectiveness of this system depends, above all, on the capability of the administrative structure — shop stewards, labor inspectors, and the courts — to defend adequately workers' interests while balancing these with national priorities.

PN-AAC-127

\$3.45

EDUCATION

GENERAL EDUCATION

AN EVALUATION OF NON-FORMAL EDUCATION IN EQUADOR, VOLUME I: EXECUTIVE SUMMARY

Laosa, L.M.; Aiken, M.C.; White, Peter
1975, 27p.

Dissemination Office, Center for the Study of Evaluation
UCLA Graduate School of Education
Los Angeles, California 90024

A short but thorough summary of a four-year joint project between A.I.D. and the University of Massachusetts. Goals in this exploration of non-formal education were: 1) To create and field-test a range of non-formal education techniques using local institutions to implement and support these techniques in a field situation; 2) to develop a number of non-formal educational methodologies which can be used by existing Ecuadorian institutions; 3) to implement selected methodologies with local institutions, including the Ministry of Education, with an on-going evaluation system designed to provide both current as well as terminal evidence of program impact; 4) to make these methodologies available to other interested agencies and to provide support for their efforts; 5) to devise and test training procedures of carrying out these methodologies and of using the support materials; and 6) to provide technical assistance in non-formal education to the Ministry of Education, and to assist the Ecuadorian Government and other Ecuadorian institutions develop non-formal education projects. The actual activities carried out during this project are examined and evaluated here in a question-and-answer format. Among the materials used in this project were games, and human "facilitators" were trained to implement them. Each year of the project, the scope and goals of both the games and facilitators were evaluated and often modified or increased as needed. Now as an office of the Ministry of Education, the Non-Formal project expects to pursue its original goals. However, the scope of its work will be more limited, as will the opportunity to explore highly experimental non-formal models; the accent will be on consolidation and systemization of the games made to date.

PN-AAB-684

\$2.20

EDUCATIONAL ALTERNATIVES IN NATIONAL DEVELOPMENT, SUGGESTIONS FOR POLICY MAKERS

Case, H.L.; Niehoff, R.O.
1976, 64p.

Institute for International Studies in Education
Michigan State University
East Lansing, Michigan 48824

(In Program of studies in non-formal education, supplementary paper No. 4)

Background information, questions, and comments about current trends in development theory and practice and their impact

PUBLIC HEALTH

on education. To prepare this monograph, the authors used their personal experience, previous publications in this series, and various studies focusing on educational planning in human resource development. The study examines the drawbacks of the present formal school programs and the fiscal possibilities of expanding them and creating new programs. Non-formal education is discussed in terms of process, teaching method, motivation, appraisal, and other characteristics. It was found that the involvement of urban and rural poor in various educational activities needs to be widened to include improving living standards, political participation, and general development. Non-formal education methods were seen as often better adapted to current needs than are formal methods. An integrated national policy and program of education is essential, with the universities as full partners, as well as with the help of volunteer agencies.

PN-AAB-947

\$5.15

AN EVALUATION ON NON-FORMAL EDUCATION IN ECUADOR, VOLUME 2: OVERVIEW AND EVALUATION PLAN

Laosa, L.M.; Alkin, M.C.; White, Peter
1975, 89p.

Dissemination Office, Center for the Study of Evaluation
UCLA Graduate School of Education
Los Angeles, California 90024

This volume of the evaluation of the University of Massachusetts Non-Formal Education Project deals primarily with the mechanics themselves of the evaluation. Generally, it attempts to answer what kinds of effects (changes) can be observed; and what the characteristics of the materials and procedures are, as they can be related locally and/or empirically to the desirable outcomes. The evaluation design was devised to answer as objectively as possible the thirteen questions examined in Volume III of this report evaluation. The design has two components: 1) The experimental field implementation and concurrent evaluation of the University of Massachusetts non-formal education games that are among the most widely used or most widely accepted education games (the University of California Los Angeles intervention study); and 2) The University of Massachusetts non-formal education intervention impact study, covering a detailed "impact profile" for each community, a qualitative analysis of the University of Massachusetts intervention, and individual testing of game session participants. This report examines in detail both of these studies.

PN-AAC-010

\$7.15

AN EVALUATION ON NON-FORMAL EDUCATION IN ECUADOR, VOLUME 3: FINDINGS

Laosa, L.M.; Alkin, M.C.; White, Peter
1975, 205p.

Dissemination Office, Center for the Study of Evaluation
UCLA Graduate School of Education
Los Angeles, California 90024

The format of this report was a series of questions and answers. Thus, this series of questions here are an outline of the report; the answers were much too long and complex to reproduce here. Volume III outlines the goals of the project, discusses each project year's activities, and answers in detail thirteen questions concerning its evaluation. They are: 1) What does the University of Massachusetts Non-Formal Education Project purport to do? 2) How does the University of Massachusetts NFE Project go about implementing its goals and objectives? 3) To what extent is the University of Massachusetts NFE Project carrying out its intended objectives effectively? 4) What are the learning outcomes of selected non-formal education materials developed by

the University of Massachusetts NFE Project? 5) What are the characteristics of the more and less effective materials developed by the University of Massachusetts NFE Project? 6) What are the characteristics of materials that work well with learners of what characteristics? What are the best matchings? 7) What facilitator/teacher variables have affected the relative effectiveness of various materials? 8) What are the motivational attributes of each of the four educational games selected for in-depth experimental analysis in the evaluation? 9) What changes in attitudes and behavior (critical consciousness) are produced by each of the selected non-formal education games? 10) What sequencing factors or prerequisites are important for the four non-formal education games? 11) What are the effects of replay frequency for each of the non-formal education games? 12) Can the University of Massachusetts NFE Project be replicated in other countries? What conditions are most necessary to ensure success? and 13) What is needed to develop effective non-formal education materials and programs in countries similar to Ecuador?

PN-AAC-080

\$16.40

AN EVALUATION ON NON-FORMAL EDUCATION IN ECUADOR, VOLUME 4: APPENDICES

Laosa, L.M.; Alkin, M.C.; White, Peter
1975, 258p.

Dissemination Office, Center for the Study of Evaluation
UCLA Graduate School of Education
Los Angeles, California 90024

The primary goal of this project was to develop non-formal educational materials and methods for various Ecuadorian communities. The principal materials used were games and human "facilitators" were trained to implement the games. The appendices of the project report cover: A) community demographic profile; description of introduction to the community; participant attendance list; description of individual games sessions; registry of reasons for participant desertion; University of Massachusetts community impact profile; B) test instructions and the actual tests in all their versions; evaluation and grading techniques; attendance information; and C) descriptions of experimental communities.

PN-AAC-081

\$20.65

PUBLIC HEALTH

GENERAL PUBLIC HEALTH

SNAIL TRANSMISSION OF SCHISTOSOMIASIS IN THE LOWER MEKONG RIVER BASIN, WITH OBSERVATIONS ON OTHER WATERBORNE DISEASES

Smithsonian Institution
1974, 229p.

Office of International and Environmental Programs
Smithsonian Institution, Washington, D.C.

The organization, methods, and findings of a study of the risk that waterborne disease might be spread as a result of water resource development projects in the Lower Mekong Basin. The research was conducted by the Smithsonian Institution in conjunction with the Applied Scientific Research Corporation of Thailand the Service National de Laboratoires de Sante Publique of Laos. By agreement with the international Mekong Committee, the work was focused on snail-borne diseases, with emphasis on schistosomiasis. Studies were concentrated on Khong Island, Laos, as well as areas of northeast Thailand, on the Mun River. Some of the 17 findings of the study: No valid reason exists for opposing construction of the Pa Mong dam on

grounds that this might cause an increase in the incidence of human schistosomiasis. The transmitting snails were not found in the Mekong River between the Burma border and the Khemarat rapids, and suitable habitats for these snails have not been located in this part of the river. The presence of an active focus of human schistosomiasis on Khong Island, Laos, is dangerous. It is not possible to predict if and to what extent the disease may be spread by construction of dams below this focus. Health considerations need to be incorporated into feasibility studies for the dam proposed at Khone Falls as well as the Ban Khoum and Pak Mum dams farther north. There are two known foci of human schistosomiasis in the main Mekong River: one at Khong Island, Laos; the second at Kratie, Khmer Republic. At Khong Island infection rates at all ages are believed to be about 15%. In the young, aged 4 to 15, the rate is about 30 to 40%. Extermination of the snail from the entire 300-mile stretch of the main Mekong River should not be attempted. General snail extermination, which could be expected to rely heavily on chemicals, would introduce undesirable and perhaps irreversible changes in the balance of nature. If snail control is attempted in the Mekong River, it should remain a focal activity. The WHO has recommended that *eradication* of schistosomiasis be tried only in areas where technical problems are not great and resources are considerable. This is not the situation in the Lower Mekong Basin. On the other hand, the relatively small number of humans currently infected or at risk in Laos and Thailand probably does not exceed 10,000. This suggests that an attempt to *reduce transmission* might have a fair chance of success and could have significant long-range implications for permanent control. Thus a Schistosomiasis Control Project should be initiated now in the Lower Mekong Basin. The project should consist of three phases: training, implementation, and evaluation. Those phases are discussed in detail in the report.

PN-AAB-946 \$18.35

MALARIA IMMUNITY AND VACCINATION; SEMI-ANNUAL RESEARCH REPORT, JULY-DEC. 1973

New Mexico University
Dept. of Biology
1974, 21p.

Department of Biology
New Mexico University
Albuquerque, New Mexico 87131

(Research summary)

The objectives of this AID-sponsored project are to develop methods for the large-scale production of malaria antigens, and ascertain efficient means of immunizing mammals, using rodent and primate testing systems. Project work has demonstrated the feasibility of vaccinating primates and rodents against malaria. The work done with rodents has involved vaccination against both the sporozoite and blood stages of malaria, while the work done with primates has involved vaccination against blood stages. As a prelude to large-scale vaccination it is imperative that *in vitro* methods of cultivation be developed so that large quantities of malarial antigens can be produced. Work is now proceeding along this line. It is not possible to obtain formation *in vitro* of early (ookinete) mosquito stages of malaria comparable to that found *in vivo*. Work is also continuing on *in vitro* cultivation of the mammalian blood stages of the parasite. It appears from recent work that bone marrow may offer a suitable substrate for growth of these stages.

PN-AAC-105 \$2.00

Please use the publication number in ordering.
Example: PN-AAB-000

ECOLOGICAL STUDIES ON Aedes Aegypti IN EAST AFRICA PRELIMINARY TO GENETIC CONTROL; ANNUAL RESEARCH REPORT, 1972/1973

Notre Dame University
Dept. of Biology
1973, 79p.

Department of Biology
Notre Dame University
Notre Dame, Indiana 46556

(Research summary)

The long-term goal of this project is to discover whether genetic control of *Aedes aegypti* is feasible under East African conditions. This Yellow Fever Mosquito is one of the half-dozen most important insects affecting mankind. It has spread to almost all tropical and subtropical areas of the world, and it transmits many viruses, including yellow fever, dengue, Asian hemorrhagic fever, Chikungunya, and quite possibly elephantiasis. The mosquito is widespread and abundant in East Africa. It is difficult and expensive to control chemically. Thus genetic means are being sought. Chromosome translocations, sex ratio distortion, genes for sterility, and other genetic devices have shown marked promise in the laboratory, but field research and trials are required to allow proper evaluation of these newer methods. Work conducted during the reporting period in East Africa was focused in several small villages in the Rabai area, west of Mombasa. The villages are satisfactory for experiments in genetic control. These villages have 10-25 buildings and a population of about 1,000 adult *Aedes aegypti*, with a natality rate of 500-100 per day. The selected villages are sufficiently distant from one another that each population can be considered a separate "ecological island." The mixture between the domestic, container-breeding, indoor form and the sylvan, tree-hole-breeding, feral form is probably not a problem, and certainly not during the dry season. Facilities and plans have been developed for mass production and release of mosquitoes bearing chromosome translocations. Genetic control experiments over the next two years of the project will involve translocation homozygotes in an attempt to replace the indigenous mosquitoes with a population of a genetic structure designed in the laboratory. This concept (the Serebrowski hypothesis) has yet to be field demonstrated. If replacement is feasible, years five and six of the project will be used to introduce conditional lethals that act seasonally; otherwise those years will be used for releases of multiple translocation heterozygotes conferring sterility.

PN-AAC-106 \$6.35

PLANNING & EVALUATION

The volumes listed below were sponsored by the Agency for International Development and were prepared by the Office of International Health, Division of Planning and Evaluation, U.S. Department of Health, Education, and Welfare.

They are aimed at identifying crucial problems in international health and potential roles for development assistance. They represent a first attempt to establish a methodology for the examination of health and the health sector in terms of its contribution and relevance to the economic and social development of selected countries. It is based upon the assumption that conditions and realities of the world are comprehensible and susceptible to ordering through the application of objective thought. It is hoped that these reports will increase the capacity of donor agencies and health professionals to deal with planning and evaluation of health programs in a context which relates such programs to the broader national and international effort to improve the well being of mankind. In this light these reports are to be accepted not only as a thoughtful first attempt, but as an effort to view developmental health assistance from a broader and more realistic perspective.

PUBLIC HEALTH

SYNCRISIS, THE DYNAMICS OF HEALTH: VOLUME I - PANAMA

Woolley, P.O.; Perry, C.A.; Eccles, R.N.
1972, 220p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 72-31)

This 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 and social psychological environment within which disease arises — 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 activities of the health sector; recent health planning activities in 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.
PN-AAB-964 \$17.60

SYNCRISIS, THE DYNAMICS OF HEALTH: VOLUME II - HONDURAS

Woolley, P.O.; Perry, C.A.; Hays, W.S.; Larson, D.L.
1972, 83p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 72-32)

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 foods 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 very few Hondurans finish secondary school. With only 65% of the available hospital 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.

PN-AAB-965

\$6.65

SYNCRISIS, THE DYNAMICS OF HEALTH: VOLUME III, PERSPECTIVES METHODOLOGY

Woolley, P.O.; Hays, W.S.; Larson, D.L.
1972, 68p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 72-33)

This 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. Chapters II and III (Health Status of the Population: Diagnosis of the Situation and Assessment of Resource Adequacy) give two aspects of sectoral planning. The ten considerations outlined in Chapter III all provide estimations of health care resources but describe only those resources within the health sector. Inter-sectoral planning attempts to identify what effect programs in a particular sector will have on other sectors and the impact of cooperation among sectors. Chapters IV (Inter-Sectoral Problem Solving) and V (Assessment of Project Impact: A conceptual Model) both rely on the concept of inter-sectoral planning. In Chapter IV, for example, the point is made that the nutritional status of a population (the health sector) is influenced directly by the crops grown for consumption (the agricultural sector) and the patterns of trade (the economic sector). 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 criteria.

PN-AAB-966

\$5.45

SYNCRISIS, THE DYNAMICS OF HEALTH: VOLUME IV, THE PHILIPPINES

Woolley, P.O.; Perry, C.A.; Gangloff, L.J.; Larson, D.L.
1972, 143p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 72-34)

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 socio-cultural 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 consequently is 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.

PN-AAB-967

\$11.45

**SYNCRISIS, THE DYNAMICS OF HEALTH: VOLUME V,
EL SALVADOR**

Woolley, P.O.; Perry, C.A.; Larson, D.L.
1972, 66p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 72-35)

This 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 in-depth analysis. Nevertheless, certain key problems became obvious; the primary area is malnutrition. It is curious that there seem to be no programs, either from the government or from the assistance agencies, to alleviate this problem. However, the Ministry of Health has proposed to increase the vaccination programs 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 to 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.

PN-AAB-968

\$5.30

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME VI,
HAITI (REVISED)**

Barkhuus, Arne
1972, 96p.

Public Health Service
Office of International Health
Division of Program Analysis
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 76-50025)

A description and analysis of the health problems and programs in Haiti, a major recipient of international assistance. Its object is to document interventions in Haiti's health system which will contribute to its socio-economic 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 Assis-

tance Offered by International Organizations, Bilateral Assistance, and Assistance Offered by Voluntary Agencies.

PN-AAB-969

\$7.70

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME VII,
LIBERIA**

Gauldfeldt, F.I.; Gangloff, L.J.
1973, 65p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50003)

Liberia's basic health problems are malnutrition, lack of potable water, inadequate sewerage disposal, and the diseases associated with vectors whose control is very expensive. Eventually all of these problems will have to be faced, but the immediate concern must be the most efficient use of extremely scarce resources to achieve the greatest impact. There is a marked disparity in the provision of health services, be they curative or preventive, between the coastal areas in which the elite resides and the hinterland in which the majority of population lives. However, available data indicate that very few of these services are utilized adequately. Another concern is that while the population has been increasing sharply over the last few years, the total budget for health activities has been decreasing. Malnutrition affects a vast majority of the Liberian population, yet by all accounts, there are readily available foods within economic reach of a large number of the population. Malnutrition is not to be blamed so much on poverty, but ignorance and superstition. Public health care, education, and training are needed badly to begin, at least, to improve environmental sanitation and population planning. Formal medical training should be brought up to date and tailored to Liberia's needs and finally, a logistics system is needed to improve drug and equipment supply.

PN-AAB-970

\$5.20

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME VIII,
ETHIOPIA**

Britanak, R.A.; Davis, J.H.; Daly, J.A.
1974, 121p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50004)

Ethiopia is a poor country; economic, physical and trained human resources are exceedingly scarce. Nonetheless the Ethiopian government has been implementing a health program which first will develop a number of instruments to improve health and then integrate them into a single, coherent health agency. A national service to combat malaria and other prevalent communicable diseases is probably the most cost-effective action available to the Ethiopian. Lack of adequate environmental sanitation and frequent malnutrition represent the most important areas in which new program initiatives would exert the greatest impact on Ethiopia's health status. The development of teams of health officers, sanitarians, and community nurses is a key element in the provincial health system. Encouraging as these programs are, they are growing only very slowly, and their administration and management are particularly weak. And although these programs are important, priority might well be given to more active programs to reduce population growth, to extend health services to the rural areas and to improve environmental sanitation and nutrition.

PN-AAB-971

\$9.70

PUBLIC HEALTH

SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME IX, DOMINICAN REPUBLIC

Lashman, K.E.; Daly, J.A.
1974, 117p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50005)

The Dominican Republic's principal health problems center around preventable high morbidity and mortality, especially in mothers, infants, and young children, coupled with undesirably high fertility rates. The potentially explosive population growth threatens to dissipate any improvements in general health status which may accrue as a result of higher income levels and improved environmental conditions, including housing and sanitation systems, coincident with economic development. Program priorities thus must focus on: 1) the extension of primary health care coverage, both quantitatively and qualitatively with particular emphasis on maternal and child health, including more concentration on family planning; and 2) nutrition programs, especially those promoting greater agricultural production of low-cost, high-protein foods. For this, an effective health infrastructure which is administratively and operationally efficient, is needed, as are well-trained personnel in all areas but particularly paramedical, sub-professional, and technical personnel willing to serve in rural areas.

PN-AAB-972

\$9.40

SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME X, GHANA

Beamer, L.G.; Gangloff, L.J.
1974, 49p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50006)

Ghana has seven major health problem areas: 1) low life expectancy, with especially high infant and childhood mortality; 2) poor nutrition, especially for young children; 3) a high incidence of communicable diseases; 4) poor and badly distributed environmental sanitation facilities; 5) a shortage and bad distribution of most kinds of health manpower and health facilities; 6) emphasis on curative rather than preventive medicine; and 7) a relatively low level of resources allocated to the health sector. To remedy these, the Ghanaian government already has increased the personnel being trained and has expanded comprehensive health services in rural areas. However, agricultural productivity needs to be improved, with special emphasis on growing more protein-rich crops. Resource allocation should be shifted from curative services to control by prevention in the area of diseases preventable by vaccination and in the provision of potable water supplies. The health care infrastructure must be reorganized, with a more efficient distribution of health personnel, better health education, and more emphasis on maternal and child health and nutrition programs.

PN-AAB-973

\$3.95

Please use the publication number in ordering.
Example: PN-AAB-000

SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XI, NICARAGUA

Holland, B.; Davis, J.A.; Gangloff, L.J.
1973, 111p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50007)

Nicaragua's major health problems are extensive malnutrition, high prevalence rates of infections and parasitic diseases, and rapid population growth. In developing Nicaragua's National Health Plan, officials have focused for the most part on those areas which create the most serious health problems and on the organizational and resource requirements necessary to alleviate them. The proportion of government funds allocated to health has increased steadily over the past decade, and unlike many other Latin American countries, Nicaragua has included the health sector in its National Socio-Economic Plan for public investment. Despite these efforts, most of the major health programs lack cohesion and direction. Recently proposed plans indicate that initial emphasis will be placed on reconstructing those health facilities destroyed in the recent earthquake. For this reason, it is even more important to make a detailed plan of action for the coming years. The actual need for treatment services must be reassessed thoroughly. It is possible that a greater impact on the health of the Nicaraguan population might be made by investments in preventive services or non-traditional treatment programs.

PN-AAB-974

\$8.90

SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XII, THAILAND

Woolley, P.O.
1974, 154p.

Office of International Health
Division of Planning and Evaluation
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 74-50008)

This study identifies Thailand's principal problems in health and socio-economic development. It emphasizes those problems influenced by or amenable to change between the Thai government and the international assistance agencies. No specific plans for action were developed, though recommendations for further study are offered. The report opens with brief examinations of Thailand's general characteristics, people and culture, education, and economy. More time is spent on an analysis of health status and planning perspectives. Four major areas of concern relevant to health are discussed: 1) rapid population growth, 2) sanitation and environmental hazard, 3) nutrition, and 4) resource adequacy, allocation, and utilization within the health sector. Although much progress has been made in Thailand's health care system, there still are great problems in delivering care to the rural areas. Both the money allocations and the manpower resources are inadequate to meet the need, and the rural population's cultural beliefs, attitudes, and values still are barriers to using the available services. The discussion here offers three planning perspectives; sectoral, inter-sectoral, and policy planning. Recommendations are made for each of the planning perspectives with examples of appropriate interventions at various levels of social organization. They are not meant to be definitive but rather are only a first step.

PN-AAB-975

\$12.35

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XIII,
BOTSWANA, LESOTHO, AND SWAZILAND**Pielemeier, N.R.
1975, 162p.Office of International Health
Division of Program Analysis
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 75-50,018)

As a result of British rule, Botswana, Lesotho, and Swaziland all have British-modeled health and education systems. The countries also share similar patterns of health and disease. Climatic and geographic factors relieve this part of Africa from a number of tropical diseases, but nutritional deficiencies in all of the countries are the same, due to the common corn-based diet. Under-nutrition is known or suspected, and the threat of drought with its accompanying malnutrition are areas of concern. Rapid population growth constrains development: cultural attitudes toward family planning are identical in each country though the response to the population problem varies in each one. The single most pressing program in the three countries is that of manpower development. All three cooperate in training and have a joint nursing council, yet their health systems all are very different, due to varying inputs from private and missionary groups and to differences in governmental response to the needs of the health sector. Despite these similarities, there are major differences among these countries and so each is treated separately in this report. Each country is examined in terms of health environment, determinants of health and disease, and health delivery system. Appendices for each country cover a general review of the background and setting.

PN-AAB-976

\$13.00

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XIV,
ZAIRE**Lashman, K.E.
1975, 193p.Office of International Health
Division of Program Analysis
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 75-50,019)

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, including mass immunization campaigns, health education, 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 development of a national nutrition strategy to identify both 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.

PN-AAB-977

\$15.45

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XV,
TUNISIA**Beamer, L.G.; Anderson, M.L.
1975, 66p.Office of International Health
Division of Program Analysis
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 75-50,020)

This case-study of Tunisia offers brief reviews of its physical setting, social environment, and economy, and then gives a lengthier look at its health situation. Major health problems are those of communicable and other diseases; environmental sanitation, nutrition, and population and family planning. Tunisia's current health care system is detailed and discussed, health policies and plans are examined, and the role of foreign assistance is described. Through a concluding summary of principal problem areas and constraints in the health sector, there is seen an urgent need for disease prevention, family planning, environmental sanitation, under- and malnutrition programs, as well as a plan for better and more equitable health care distribution, more training of physicians and other medical personnel, more hospitals, and more effective health planning.

PN-AAB-978

\$5.30

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XVI,
ARAB REPUBLIC OF EGYPT**Furnia, A.H.
1975, 86p.Public Health Service
Office of International Health
Division of Program Analysis
U.S. Department of Health, Education, and Welfare
Washington, D.C.

(In DHEW publication No. (OS) 76-50026)

This rather thorough study of Egypt's health and socio-economic 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 emphasis still should be on generalists. In addition, not nearly 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.

PN-AAB-979

\$6.70

**SYNCRISIS: THE DYNAMICS OF HEALTH: VOLUME XVII,
BANGLADESH**Loomis, S.A.
1976, 104p.Public Health Service
Office of International Health
Division of Program Analysis
U.S. Dept. of Health, Education, and Welfare
Washington, D.C.

PUBLIC HEALTH

(In DHEW publication No. (OS) 76-50035)

Bangladesh, with its estimated 78 million people inhabiting an area the size of Wisconsin, has been experiencing a growing imbalance between the numbers of its people and the carrying capacity of the land. According to the Bangladesh government, 50 percent of the population is suffering from malnutrition. If the current population growth rate of three percent continues, the 1998 population will be 145 million, or 950 persons per square kilometer. Reliable health statistics are notably lacking in Bangladesh. Available information indicates that the current crude death rate is about 17 per 1,000; average life expectancy at birth is 48 years. The infant mortality rate is estimated to be 140 per 1,000 live births; 40 percent of all deaths occur in the 0-4 age group. The immediate causes of most deaths are infectious diseases such as cholera, diarrheal diseases, tuberculosis, and measles. Malnutrition is often a contributing factor. General malnutrition stems from four factors: (1) the rapid population growth, which is offsetting any gains in agricultural production and distribution; 2) a low per-capital income, which limits the quantity and quality of food consumed; 3) a high incidence of diarrheal diseases; and 4) dietary attitudes and practices that restrict nutrient intake. The only official document on national health policy in Bangladesh is the chapter on health in the First Five-Year Plan, 1973-1978. The Plan advocates establishing an integrated and comprehensive rural health care system aimed primarily at infants, children, and mothers. However, government actions have not been consistent with the Plan, and the original goal of establishing at least one 25-bed hospital and outpatient clinic in each of the 356 rural counties has evidently not been emphasized. Scattered government health services have had minimal effects. While Bangladesh has about 7,000 physicians, over 75 percent of them are working in urban centers. Medical education has been hospital-oriented, with minimal emphasis on public health, and many graduates prefer to emigrate rather than remain in Bangladesh. The lack of trained and licensed nurses represents the most critical manpower shortage in the country. In 1973 the country had only 700 nurses—all urban-based and hospital-oriented. A potable water supply is available to only a small fraction of the Bangalee population. Of 185,000 tubewells in rural areas, 30 percent of them were reported in 1973 to be inoperative because of silting or poor maintenance. The Five-Year Plan called for an increase of 286,200 tubewells, to be provided by UNICEF. Little progress has been made in construction of either tubewells or watersealed latrine slabs. Examination of the Bangladesh national budget reveals that health is not a national priority. Health funding is less than five percent of the total budget, with very little allocated for rural primary care services. However, the new national leadership is apparently beginning to grapple with the urgent health problems. The most critical need is to control fertility to slow the rate of population growth.

PN-AAC-135

\$8.35

NUTRITION

EXPERIMENTAL PRODUCTION OF ATTA

Chaudhry, M.S.; MacMasters, M.M.; Farrell, E.P.; Hoover, W.J.
1968, 27p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Studies on attas and chapatis, I, pp. 101-128)

A description of a study designed to evaluate various methods of producing coarse flour (atta) and making unleavened bread (chapatis) from it, using several kinds of U.S. and Pakistani wheats. Chapatis made from atta is a common food in Pakistan

and India. Attas of 80% and 95% extraction were common food in Pakistan and India. Attas of 80% and 95% extraction were prepared from Hard Red Winter, Hard Red Spring, Durum, White Club, Soft Red Winter, and Pakistani wheats. The particle size distribution of experimental attas were in the range of that of typical Pakistani attas. The composition and doughy characteristics of the experimental attas were experimentally varied. The chapatis made from the attas was evaluated in terms of its sight, aroma, and taste appeal by a panel of experienced chapatis-eaters, using a scoring system devised for the experienced chapatis-eaters, using a scoring system devised for the purpose. All attas except those produced from Durum wheat yielded satisfactory chapatis. Color is apparently a major factor in determining acceptability; the White Club and Pakistani wheat products were judged significantly more acceptable than those made from any red wheat.

PN-AAB-872

\$2.20

NUTRITIONAL VALUE OF CHAPATIS WITH AND WITHOUT ADDED LYSINE

Chaudhry, M.S.; MacMasters, M.M.; Hoover, W.J.
1968, 15p.

Department of Grain Science and Industry
Kansas Agricultural Experiment Station
Kansas State University, Manhattan, Kansas 66502

(In Studies on attas and chapatis, II, pp. 129-144)

The methods and results of a study of the comparative nutritional value of various wheat flours (attas) and unleavened breads (chapatis) fed to rats during an eight-week trial period. Rats were fed attas of 80% and 95% extraction, and chapatis made from them, with and without vitamin and mineral supplementation, and with lysine at two levels of supplementation. Growth rates and protein efficiency ratios (PER) were evaluated weekly for eight weeks. The PER values were higher for chapatis than for the attas from which they were prepared. Vitamin and mineral supplements resulted in an increase in PER during the eight weeks. Diets with lysine added but no vitamins and minerals added resulted in improved PER during the first four weeks but a declining PER during the subsequent four weeks. Livers of rats fed lysine-supplemented diets had lower moisture content and higher protein content than those of rats on other diets. The results tend to show that fortification of cereal products with lysine, without concurrent fortification with vitamins and minerals, may not be of value when the products form essentially the only article of diet, as is often true in developing countries.

PN-AAB-873

\$2.00

AMINO ACID COMPOSITION AND ENERGY VALUE OF IMMATURE SORGHUM GRAIN

Deyoe, C.W.; Shoup, F.K.; Miller, G.D.; Rathurst, J.; Liang, D.; Sanford, P.E.; Murphy, L.S.
1970, 5p. 664.72.D529

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Cereal chemistry, V. 47, No. 4, pp. 363-368)

A report of the effects of immaturity on the proximate and amino acid composition and nutritional value of sorghum grain. Samples of several varieties (specified) of immature and mature hybrid sorghum grain were analyzed and also fed to chicks in a growth study. The results indicate marked differences in amino acid content of the grains. Immature hybrid sorghum grain had higher levels of lysine, aspartic acid, and glycine, and lower values of glutamic acid, proline, and leucine. The crude protein content of immature and mature sorghum grains was similar.

Feeding studies indicated that immature grain provided chicks less available energy for growth.
PN-AAB-874 \$2.00

BLEND K BREAD

Hoover, W.J.
1971, 3p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Soybean digest, Nov. 1971)

This article describes how Blend K, a fortified wheat flour, has been developed as a promising means of combatting protein-calorie malnutrition throughout the world. As a result of huge shipments of wheat to Latin America and Asia under the P.L. 480 program, bread consumption is rising rapidly in developing countries. While bread produced in the U.S. has long been fortified with vitamins and minerals, flour milled in most developing countries is not yet being enriched. Soy flour has long been recognized as an excellent means of fortifying the proteins of cereal grains because of its high content of a protein rich in lysine. Corn-soy and wheat-soy products are extensively used in nutritional programs, but, because of secondary effects of their properties, they have not been used in significant quantities in baked foods such as bread. Attempts to fortify wheat flour with soy flour beyond the 3% to 5% level have caused adverse effects on absorption, mixing, and fermentation, as well as on the volume, crumb, color, and flavor of bread. In 1971 Tsen and Hoover at Kansas State University found that the use of three dough conditioners, SSL, CSL, and EM, permitted production of high-quality breads even when high levels of nonwheat protein were in the formula. K-State workers have found that bread of acceptable quality could be made with 16% soy flour or 24% full-fat soy flour in the formula. The bread costs no more per loaf than ordinary bread, and it stays soft several days longer than regular wheat flour bread. The nutritional significance of this development is apparent. Soy flour is a valuable additive for bread not only for its high-protein content but for its 3.2% to 3.8% lysine, compared to 0.38% in wheat flour. The lysine content of a mixture of wheat fortified with 12% soy flour more than doubles, up to 0.76% to 0.83%. The soy-fortified bread has a protein content of about 11.5% compared to about 8% for conventional bread. Feeding studies at Kansas State have shown that the growth rate of weanling rats fed soy-fortified enriched bread over a four-week period was seven times the growth rate of rats fed standard enriched bread. One measure of the nutritional effectiveness of a protein is the protein efficiency ratio (PER), or the amount of weight gain divided by the amount of protein consumed. Wheat-flour bread has a PER of about 1.0, while the 12% fortified soy-flour bread has a PER of 1.95. A specification for a protein-fortified wheat flour has been proposed for inclusion in P.L. 480 purchase programs. This product, called Blend K, would consist of 100 parts bread wheat flour, 12 parts soy flour, 0.5 parts SSL, and added vitamins and minerals. Blend K is now being tested in many countries. It can be used in doughnuts and cookies that have double the normal protein content and only two-thirds the normal level of calories. It appears that the era of use of soy-flour-fortified wheat flour for making high-protein breadstuffs is at hand.

PN-AAB-876 \$2.00

IMPROVING BREADMAKING PROPERTIES WITH GLYCOLIPIDS: IMPROVING SOY PRODUCTS WITH SUOROESTERS (AND) IMPROVING VARIOUS PROTEIN-ENRICHED PRODUCTS

Pomeranz, Y.; Shogren, M.D.; Finney, K.F.
1969, 17p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Cereal chemistry, V. 46, No. 5, pp. 503-518)

A summary of the effects of synthetic sucroglycerides on quality of soy enriched breads. The improving effects of synthetic glycolipids are compared with the effects of commercial shortening and of polar wheat flour lipids rich in galactolipids. The conclusions presented in Part I of this paper are that sucroesters seem to improve bread quality by rendering the soy proteins functional in breadmaking. Sucroesters counteracted the loaf volume-depressing effects of the soy products. Mixing synthetic glycolipids with soy flours or adding glycolipids at the dough-mixing stage therefore appears useful in producing nutritionally improved bread acceptable to consumers. The sucroesters appear useful in manufacturing bread low in the saturated fatty acids in shortening, or of protein-rich dietetic breads, which have been recommended as effective supplements to diets to treat obesity. The effects seem to indicate that the synthetic glycolipids make the noncereal proteins functional in breadmaking. The effects of sucroesters on breadmaking potentialities of proteins from other sources are reported in Part II of this series. The reasons for differences in mechanism and performance in breadmaking of synthetic and natural wheat flour glycolipids are being investigated.

PN-AAB-877 \$2.00

AMINO ACID COMPOSITION AND NUTRITIONAL VALUE OF MILLED FRACTIONS OF SORGHUM GRAIN

Shoup, F.K.; Deyoe, D.W.; Skoch, L.V.; Shamsuddin, M.; Bathurst, J.; Miller, G.D.; Murphy, L.S.; Parrish, D.B.
1970, 8p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Cereal science today, V. 15, No. 5, pp. 266-273)

The methods and results of a study of the nutritional effects on albino rats of diets of low- or high-protein milled fractions from two sorghum-grain hybrids of equal protein content were milled with conventional dry-milling equipment. The protein content of the endosperm fractions ranged from 6.82 to 15.96%. The fat, fiber, and ash contents of all fractions were about 1.0, 1.0, and 0.5% respectively. Amino acid composition of the fractions varied. On the basis of essential amino acid contents, the nutritional quality of low-protein fractions was superior to that of high-protein fractions. Nutritive value of milled products of low- and high-protein content from each hybrid was compared on the basis of growth and protein efficiency ratios (PER's) of rats, with casein control diets used. Each fraction was fed with and without lysine and methionine supplements. When diets were not supplemented with lysine and methionine, the low-protein endosperm fraction was superior to the high-protein endosperm fraction. However, when the low- and high-protein fractions were supplemented with amino acids to meet calculated requirements, differences were not found, indicating that protein was utilized similarly when deficient amino acids were supplied. Amino acid supplementation of diets caused a marked increase in weight gain of rats, and PER's were similar to those obtained with casein. Differences in PER's relating to hybrids were non-significant, irrespective of amino acid supplementation.

PN-AAB-878 \$2.00

Please use the publication number in ordering.
Example: PN-AAB-000

PUBLIC HEALTH

HIGH-PROTEIN BREADS: SOY FLOUR BREAD, KANSAS STATE PROCESS FOR MAKING

Tsen, C.C.; Tang, R.T.
1971, 6p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In Bakers digest, V. 45, No. 5, p. 26-27, 30-32)

A simple method for making high-protein bread would be valuable for improving the human diet worldwide. Of all the protein-rich foodstuffs now available, soy flour is the most attractive in price and quality for fortifying wheat flour to produce high-protein breads. However, soy flour can have adverse effects on the absorption, mixing, and fermentation of the dough as well as on the volume, grain, and color of the bread. This study evaluates various processing conditions, with special attention to fermentation, to simplify and shorten the breadmaking process. The results are discussed here, in particular the effects of: 1) fermentation time and yeast level; 2) bromate; 3) fermentation and floor times and bromate; 4) additives, yeast, and bromate; and 5) cysteine, bromate, mixing, and dough temperature on the quality of bread containing 12% soy flour and 0.5% sodium stearoyl-2 lactylate.

PN-AAB-920

\$2.00

NEW CONCEPTS FOR USE OF SOY FLOUR IN BAKING, PREPARATION OF HIGH-PROTEIN BREAD

Tsen, C.C.
1971, 17p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

Of all the protein-rich foodstuffs available today, soy flour is the most attractive in price, quality, and quantity for making high-protein breads. Recent advances in soy flour processings, including heat and chemical treatments or cook-extrusion, have made soy flour more suitable for baking uses. Conditions for making soy breads have been studied in conjunction with absorption, mixing, oxidation, and fermentation requirements. Various agents such as lecithin, glyceryl monostearate, natural and synthetic glycolipids, and lactylates (CSL and SSL) have been used to improve the baking performance of soy dough, the results of which are detailed here. However, additional studies are needed to find ways of improving the actions of these agents.

PN-AAB-921

\$2.00

THE USE OF EMULSIFIERS FOR PRODUCING PROTEIN-FORTIFIED BREAD

Tsen, C.C.; Hoover, W.J.
1971, 8p.

Department of Grain Science and Industry
Kansas State University
Manhattan, Kansas 66502

(In PAG bulletin, V. 11, No. 3, p. 42-50)

Bread is an ideal food to fortify with protein because it is a staple food in many countries, but fortifiers such as soy flour can induce adverse effects on dough properties and bread quality. In this study three food emulsifiers (sodium stearoyl-2-lactylate, calcium stearoyl-2-lactylate, ethoxylated monoglycerides) were used to improve effectively the baking performance of wheat flour fortified with soy flour or other protein-rich additives, with no adverse effects. Accordingly, acceptable high-protein bread containing a high level of soy flour or other protein-rich additives

such as cottonseed flour and fish protein concentration can be made by adding one of these three food emulsifiers.
PN-AAB-922

\$2.00

FRACTIONATION OF SOLUBLE PROTEINS OF HIGH-LYSINE AND NORMAL SORGHUM GRAIN

Jambunathan, Ramamurthi; Mertz, E.T.; Axtell, J.D.
1975, 3p.

Department of Agronomy
Purdue University
Lafayette, Indiana 47967

(In Cereal chemistry, V. 52, No. 1, p. 119-121)

The discovery that *opaque-2* and *floury-2* mutant strains of maize had an improved protein quality has stimulated considerable research on the improvement of protein quality of other cereals. A mutant gene (*h1*), is similar to *opaque-2*, recently as identified in sorghum, and after screening over 9,000 lines in the world sorghum collection, two dented floury lines of Ethiopian origin were selected, IS11758 and IS11167, which are high in lysine concentration at relatively high levels of protein. When the *opaque-2* gene is incorporated into normal maize, the prolamine (zein) is reduced and the glutelins, albumins, and globulins increased, resulting in a larger amount of lysine in the whole kernel. This report examines the distribution of soluble protein fractions in high-lysine sorghum kernels and compares them with the fractions in the normal sorghum with similar genetic background.

PN-AAB-924

\$2.00

RESEARCH TO PRODUCE NEW OR IMPROVED PRODUCTS

Graham, G.G.
1971, 18p.

Department of Research, British-American Hospital
Lima, Peru, and Johns Hopkins University
615 N. Wolfe Street
Baltimore, Maryland 21205

(Presented at Review of Centrally Funded AID Research, Washington, D.C.)

The problem of infant and preschool child malnutrition has created an ever-growing need for solutions. It has been demonstrated that a number of previously neglected sources of protein or mixtures of these and cereal grains, could support seemingly normal growth in convalescent malnourished infants or actually initiate their recovery. This report is an evaluation of new protein sources for the prevention of malnutrition. Nitrogen retentions from different sources of protein at isonitrogenous, isocaloric levels in the same child were compared, with emphasis on serum albumin levels as an adjunct to rates of weight gain and linear growth during prolonged feeding. The ability to initiate recovery in the severely malnourished child also was measured. The foods discussed and evaluated here are: isolated soy protein, toasted soy flour "milk", isolated soy protein "milk", corn-soy-milk, corn-soy-wheat-methionine, corn-soy-wheat noodles, wheat flour, wheat flour-wheat concentrate Ms-15, wheat-soy blends WSB and Mx-44, oat-soy mixture Mx-45, soy-whey mixture, rice, flour, rice-cottonseed flours, casein-MCT-dextrose mixtures, and mandioca-soy. Very brief reviews of parallel research studies also are given: Lactose intolerance, growth studies, and hormonal adaptation.

PN-AAC-101

\$2.00

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SCIENCE AND TECHNOLOGY

GENERAL SCIENCE AND TECHNOLOGY

DEVELOPMENT AND FIELD TESTING OF THE COCONUT FIBER-BURNT RICE HUSK FILTER FOR SUPPLYING DRINKING WATER TO RURAL COMMUNITIES IN SOUTHEAST ASIA. PHASE 2

SEATEC
1975, 94p.

Southeast Asia Technology Co. Ltd
(SEATEC) Consulting Engineers
489 Sukhumvit Road, (Sol 27), Bangkok, Thailand

The results of field tests of a simple, inexpensive, and efficient method of water treatment for rural communities in Southeast Asia. The method consists of filtering stream or pond water through 80 cm of shredded coconut fiber and then through 80 cm of burnt rice husks. The coconut fiber reduces turbidity and removes suspended solids, while the rice husks achieve the second or polishing stage in turbidity and remove bacteria. The burnt rice husks also remove taste, color, and odor through the process of absorption. The method was developed in two years of laboratory research at the Asian Institute of Technology, Bangkok. Pilot-plant testing of the new two-stage system began in 1973 under a research contract with UN/ECAFE, with financial assistance from USAID, in Thailand, Cambodia, Vietnam, and Laos, but was continued in 1974 only in Thailand because of insecure conditions in the other countries. This report on Phase II of the research presents the results of a study of pilot plant operations in Ban Som and Ban Nong, Thailand, villages of 800 and 5,000 persons, from February through October, 1975. Also reported on is a field test of an individual-family-sized filter employing a single-jar dual-media unit. Among the research findings: Several filters operated successfully for nine months with minimum supervision of the village operators. Filter media were changed only twice in the nine-month period. The filters are capable of treating most surface waters successfully without the need for chemicals, except for waters with abnormally high colloidal turbidities. But those waters can be treated by the filter by adding coagulant chemicals to the raw water. The bacteria removals achieved averaged 76 to 86 percent, although the removals varied considerably; individual grab samples varied from 30 to 100 percent removal. Effluent quality was particularly erratic during the first ten days after media changes, prior to the build-up of a biological layer on the surface of the media. In all cases disinfection of the final effluent would be necessary to meet recommended international bacteriological standards. The filter is less efficient at removing bacteria than is slow sand filtration (which generally removes 98-99 percent bacteria), but it is ten times faster, and slow sand filters cannot effectively handle the high-turbidity waters in Southeast Asia without preliminary treatment by either chemical coagulation and sedimentation or roughing filters. The quality of the treated water physically was good; it was generally sparkling clear, with a turbidity of less than 5JTU, and it was colorless, odorless, and without any noticeable taste. In general, treated water met WHO international standards for clarity, taste, odor, and color, although a disinfectant such as chlorine needs to be used to reduce the coliform densities to the usual standards (1 coliform per 100 ml in the U.S.). Future research recommended includes continuation of the pilot plant study at Ban Nong, field testing of simple chlorinator at both villages, analyses of the filter materials, continued field testing of the jar filters, introduction of hand and/or bicycle pumps (instead of gasoline-powered) and recording of villager reactions, and definition of extended research involving 20 villages over a ten-year period.

PN-AAB-945

\$7.55

APPROPRIATE TECHNOLOGIES FOR INTERNATIONAL DEVELOPMENT; PRELIMINARY SURVEY OF RESEARCH ACTIVITIES

Symposium on Priorities on Innovating and Adapting Technologies for Asian Development, Princeton University, 1972; AID/TA/OST 1972, 63p.

Office of Science and Technology
Technical Assistance Bureau
Agency for International Development
Washington, D.C. 20523

(In TA/OST 72-11)

The three papers presented in this report were prepared for a symposium on "Priorities on Innovating and Adapting Technologies for Asian Development". The scope of the papers was extended to include Africa and Latin America as well as Asia. The first paper, "The Role of the Research Institute in Industrial Growth", is based on observations during a one-year analysis of industrial research institutes in developing countries. The second paper describes "Research Interests of Foreign Assistance Agencies Concerning Appropriate Technology" by drawing on information acquired in a wide variety of forums. Although it is not intended to be complete in its coverage, most of the current activities of significant magnitude are discussed, with the exception of activities in the Peoples' Republic of China, the USSR, and Eastern Europe. The third paper addresses "Multi-national Corporations and Adaptive Research of Developing Countries". It examines selected types of activities of multi-national corporations as illustrative of their involvement and interest in the technological development of developing countries.

PN-AAC-087

\$5.05

HIGHWAY CONSTRUCTION

EVALUATION FRAMEWORK FOR TRANSPORTATION PLANNING IN DEVELOPING COUNTRIES; ANNUAL PROGRESS REPORT, 1974/1975

MIT. Dept. of Civil Engineering
1975, 70p.

Department of Civil Engineering
Massachusetts Institute of Technology
Cambridge, Massachusetts
(Research Summary)

A program to develop improved guidelines for evaluating low volume road investments in developing countries. It focuses both on project level decisions and on planning, programming and budgetary decisions for the road network as a whole. The first year of the program consisted of four tasks — 1) modification of an existing project evaluation model — the Highway Cost Model — to reflect recent research in road deterioration and user costs; 2) demonstration of the usefulness of the model in assessing road construction projects in East Africa; 3) building institutional linkages for subsequent use of the model within the highway department of an East African country; and 4) the development of a framework for making planning, programming, and budgetary decisions for road networks.

PN-AAC-179

\$5.60

THE HIGHWAY COST MODEL: APPLICATION TO THE DAR ES SALAAM-MOROGORO SECTION OF THE TANZANIA-ZAMBIA HIGHWAY

Bhandari, Anil; Berger, Fredric
1975, 98p.

Program for Transportation Planning in Developing Countries,
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

SCIENCE AND TECHNOLOGY

The application and use of the Highway Cost Model was demonstrated in the present case-study in three different experiments with the model. By specifying different demand responsive maintenance policies, it was possible to compute, using the HCM, the maintenance expenditure that would be required to maintain the existing new roads such that their Present Serviceability Index never fell below a specified minimum. By analyzing the yearly report on pavement condition, as computed by the HCM, it was possible to analyze the deterioration characteristics of the SRI pavement proposal under the heaviest traffic case and a moderate maintenance policy that included no overlays. In a feasibility level experiment with the HCM, it was shown that the model could be used to evaluate simultaneously a large number of alternatives in terms of different pavement designs and maintenance policies. Finally, with the help of the HCM, it was possible to examine the effects of traffic overloading on pavement deterioration and to evaluate post-construction investment strategies in terms of different maintenance policies for the newly constructed road.

PN-AAC-180

\$7.85

THE HIGHWAY COST MODEL GENERAL FRAMEWORK

Moavenzadeh, Fred; Berger, Fredric; Brademeyer, Brian; Wyatt, Robert
1975, 122p.

Program for Transportation Planning in Developing Countries
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

A description of an analytic model—the Highway Cost Model—for use in evaluating alternative design and maintenance strategies for low-volume roads. The focus of the model is on project-level engineering decisions and their implications for total transport costs. The types of decisions which are within the scope of the model include the choice of alignment, geometric standard, surface type, maintenance policy, and construction and maintenance methods. The costs considered include construction, maintenance, and road user costs, all of which are estimated in terms of the labor, equipment, and material resources required. The model may be used at both the pre-feasibility and feasibility states of project evaluation, and has been structured so that it provides information useful in both budgetary and economic planning of low volume roads.

PN-AAC-181

\$9.80

ENVIRONMENT

ENVIRONMENTAL PLANNING, READING REFERENCES, VOLUME 1 of 5

McJunkin, F.E.
1976, 305p.

International Programs, Department of Environmental Sciences and Engineering
School of Public Health, University of North Carolina
Chapel Hill, North Carolina 27514

Prepared for international seminar on the environment conducted at the University of North Carolina. A limited number of sets are available for libraries of international organizations.

This volume of eight selected papers on the subject of environmental planning is one of five volumes of readings prepared for participants in the IPEAID seminar conducted at the University of North Carolina in March-April, 1975. The other four volumes are entitled Water Quality Management and Solid Wastes, Air Quality Management, Industrial Pollution, and Resources and the Environment. The authors and titles of papers included in this Volume 1:

Varre, Remi. Environmental management, economic development, and social welfare: the economic basis for environ-

mental considerations in socioeconomic development policies and planning.

Carroll, John B. The relevance of planning for land use and environmental impacts in industrializing countries.

Council on Environmental Quality. The economic impact of environmental programs.

Environment Directorate. Environmental standards: definitions and the need for international harmonization.

Francis, Walton J. A report on measurement and the quality of life, and the implications for government action of *The Limits to Growth*.

Kaiser, Edward J. Urban land use planning for industrial development.

Leak, Robert E. Speech before United Nations industrial development committee.

U.S. Atomic Energy Commission. Preparation of environmental reports for nuclear power plants.

PN-AAB-936

\$24.40

WATER QUALITY MANAGEMENT — SOLID WASTES, READING REFERENCES, VOLUME 2 OF 5

McJunkin, F.E.
1976, 244p.

International Programs, Department of Environmental Sciences and Engineering, School of Public Health
University of North Carolina
Chapel Hill, North Carolina 27514

Prepared for international seminar on the environment conducted at the University of North Carolina. A limited number of sets are available for libraries of international organizations.

These 17 selected papers on the subject of Water Quality Management—Solid Wastes comprise the second of five volumes prepared as reading references for participants in the IPEAID seminar conducted at the University of North Carolina in March-April, 1975. Titles of the other volumes are: (1) Environmental Planning; (3) Air Quality Management; (4) Industrial Pollution; and (5) Resources and the Environment. Authors and titles of papers in this Volume 2:

Barnes, George E. Measuring the monitoring of waste flows. Illustrated lecture on sewage treatment methods and devices. Sewage and industrial wastes.

Carroll, John B., and McJunkin, F. Eugene. A collection of source materials on the subject of solid waste management.

Federal Water Pollution Control Administration. A primer on waste water treatment.

Feuerstein, Donald L. Ocean outfall disposal systems.

Kriz, G.J., et al. Beef cattle waste management alternatives. Dairy waste management alternatives. Poultry waste management alternatives. Swine waste management alternatives.

Lamb, James C. III. Sources of water, and key factors in selecting water sources.

Stream sampling: location, timing, and types of samples.

Summary of Public Health Service drinking water standards, 1961.

McGauhey, P.H., and Golucke, Clarence G. Control of industrial solid wastes.

Okun, Daniel A. Planning for water management projects.

Sources of water. Water and industrial development.

PN-AAB-937

\$19.55

Please use the publication number in ordering.
Example: PN-AAB-000

AIR QUALITY MANAGEMENT, READING REFERENCES, VOLUME 3 OF 5

McJunkin, F.E.
1976, 215p.

International Programs, Department of Environmental Sciences and Engineering, School of Public Health
University of North Carolina
Chapel Hill, North Carolina 27514

Prepared for international seminar on the environment conducted at the University of North Carolina. A *limited* number of sets are available for *libraries* of international organizations.

Four papers dealing with air quality management is the third of five volumes assembled for use by participants in the IPEAID seminar conducted at the University of North Carolina in March-April, 1975. Volume 1 is entitled Environmental Planning; Volume 2, Water Quality Management—Solid Wastes; Volume 4, Industrial Pollution; Volume 5, Resources and the Environment. The authors and papers in this third volume:

Kornreich, Lawrence D. Air pollution and its control.

Peterson, James T. Diffusion Processes at large and small scales.

Reist, Parker C. Control of gaseous emissions by combustion.

Turner, D. Bruce. Workbook of atmospheric dispersion estimates.

PN-AAB-938

\$17.20

INDUSTRIAL POLLUTION, READING REFERENCES, VOLUME 4 OF 5

McJunkin, F.E.
1976, 274p.

International Programs, Department of Environmental Sciences and Engineering
School of Public Health
University of North Carolina
Chapel Hill, North Carolina 27514

Prepared for international seminar on the environment conducted at the University of North Carolina. A *limited* number of sets are available for *libraries* of international organizations.

Eighteen selected papers dealing with industrial pollution is the fourth of five volumes of reading references assembled for use by participants in the IPEAID seminar conducted at the University of North Carolina in March and April of 1975. The subject matters of the five volumes are, respectively: Environmental Planning; Water Quality Management—Solid Wastes; Air Quality Management; Industrial Pollution; Resources and the Environment. The papers in this fourth volume:

Amdur, Mary O. Industrial toxicology.

Anderson, A.E. Environmental consideration in the location of industry.

Barnes, E.C. Ionizing radiation.

Barnes, G.E. Plating and metal finishing.

Fraser, D.A. The environment and the industrial workers. Principles of industrial toxicology.

International Bank for Reconstruction and Development. The World Bank, industrial development, and the environment.

Irish, D.D. The significance of the occupational environment as part of the total ecological system.

Lamb, J.C. III. Bibliography on industrial wastes. Guidelines for the control of industrial wastes: cane-sugar industry wastes. Guidelines for the control of industrial wastes: livestock wastes. Guidelines for the control of industrial wastes: pulp and paper manufacturing wastes. Guidelines for the control of industrial wastes: metal finishing wastes. Summary of industrial waste: its origin, character, and treatment.

Little, L.W. Select bibliography relating to brine wastes and their treatment.

Waste handling problems of the pickle and olvie industries.

Peterson, J.E. Principles of controlling the occupational environment. State Committee for Construction (GOSSTROJ) of the Council of Ministers of the USSR. Sanitary norms and standards for planning industrial undertakings.

PN-AAB-939

\$21.95

RESOURCES AND THE ENVIRONMENT, READING REFERENCES, VOLUME 5 OF 5

McJunkin, F.E.
1976, 305p.

International Programs, Department of Environmental Sciences and Engineering, School of Public Health
University of North Carolina
Chapel Hill, North Carolina 27514

Prepared for international seminar on the environment conducted at the University of North Carolina. A *limited* number of sets are available for *libraries* of international organizations.

These 13 selected papers on the subject of Resources and the Environment comprise the fifth of five volumes prepared as reading references for participants in the IPEAID seminar conducted at the University of North Carolina in March-April, 1975. Titles of the other volumes are: (1) Environmental Planning; (2) Water Quality Management—Solid Wastes; (3) Air Quality Management; (4) Industrial Pollution. Authors and titles of papers in this Volume 5:

Barre, Remi. Energy and the environment. The environmental impact statement as practiced in the United States.

Carmichael, Jack B. Environmental considerations in the planning and evaluation of development projects. Excerpts include:

“Case Study: Ecological Survey of the Menta River in the Country of Farmington.”

“Case Study: Hydroelectric Project for the Country of Odi.”

“Case Study: Iron Ore Project in the Country of Edel.”

“Case Study: Nickel Ore Mining and Refinery Project in the Country of Teleroy.”

Chanlett, Emil T. Environmental quality issues.

Christman, R.F. Human population growth.

Cloud, Preston. Mineral resources in fact and fancy.

Daly, Herman E. Electric power, employment, and economic growth: A case study in growthmania.

Environment Directorate. Report on environmental impact of airport development.

Gregory, Delores. Notes on international availability of publications of the U.S. National Technical Information Service and the U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. Common environmental terms - a glossary.

PN-AAB-940

\$24.40

INDUSTRIAL DEVELOPMENT

DIRECTORY OF CONSULTANTS TO SMALL RURAL INDUSTRIES

Auciello, K.E.; Johnston, Richard
1975, 50p.

Economic Development Laboratory, Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

This directory of 31 organizations in 18 countries, plus 16 individual consultants in 10 countries, was compiled by the Economic Development Laboratory of the Georgia Institute of Technology from responses to a questionnaire mailed to readers of EDL's *Small Industry Development Network Newsletter*. It lists organizations and individuals experienced and currently

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interested in assisting, on a contract basis, the development of small rural industries in developing countries. The entry for each organization lists its name, address, phone, cable name, name of person to contact, geographic areas of interest, staff size, name of person to contact, geographic areas of interest, staff size, language capabilities, representative project experience, and fields of capability. Similar information is listed for the 16 individual consultants. This publication was designed as a pilot project for a more comprehensive directory. "Small rural industries" was defined as agro-industrial establishments of 20 or fewer employees; "assistance" was defined as a systems approach to aspects of technical and managerial assistance.

PN-AAC-070

\$4.00

A TRAINING PROGRAM ON THE ANALYSIS AND EVALUATION OF INDUSTRIAL PROJECTS

Clifton, D.S.; Collier, R.E.; Fyffe, D.E.
1975, 283p.

Industrial Development Division,
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

(Presented at Seminar on Analysis and Evaluation of Industrial Projects. Georgia Institute of Technology, 1975)

A compilation of materials presented at a "package" seminar designed for joint presentation by the Georgia Institute of Technology and the University of the Philippines during the week of June 23-27, 1975. The purpose of the seminar was to furnish orientation, professional training, and the exchange of information between university, governmental, and development organization personnel involved in project development, analysis, appraisal, or implementation. The seminar was designed to (1) make personnel involved in development work more sensitive to the generation, identification, and screening of venture ideas; (2) train personnel involved in development work so that they may assist entrepreneurs in the analysis of venture opportunities and preparation of investment proposals; and (3) train personnel involved in development work to be able to conduct appraisals of proposed investments. Topics addressed in the seminar, and in the materials in this publication, include the investment proposal, an overview of the process for industrial project analysis, generation and screening of venture ideas, market analysis and pricing policies, technical analysis, financial analysis, appraisal of investment proposals, and a bibliography.

PN-AAC-071

\$22.65

FINANCING SMALL-SCALE INDUSTRY: THE TUBARAO, BRAZIL CASE

Kaatz, J.R.
1976, 38p.

Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332

Findings of a study of financing arrangements available to small entrepreneurs in the City of Tubarao, in Southern Brazil, with the emphasis on the cost and supply of longer-term funds. Tubarao occupies 138 square miles in the state of Santa Catarina, and in 1970 had a population of 67,000. In 1969, Tubarao had 145 manufacturing establishments. They employed 2,909 persons. The average size of manufacturing establishments in Tubarao is smaller than the average size of all establishments in the state. Employment opportunities for women in Tubarao are very limited. Some 85% of all women above the age of 10 have no income. Thus, there is a substantial pool of potential labor available. Seven commercial banks have branches in Tubarao, including the Bank of Brazil, the dominant one, in which the government

has the controlling interest. This bank also acts as financial agent for the National Treasury. Its activities are meshed with those of the Central Bank through the "monetary budget," which plans lending volumes and other operations related to expansion of the monetary base and money supply. In addition to the commercial banks, there is a branch of the Caixa Economica Federal, which is like a U.S. savings and loan association, except that it accepts demand deposits. Despite the appearance of a competitive banking market, little discretion is left to these institutions, particularly in credit allocations. Government priorities and programs control the pattern of investment, and the Bank of Brazil favors farm borrowers over small industry borrowers. Most new small businesses are financed by the Regional Economic Development Bank (BRDE); but officials at this bank stated that the smaller the enterprise financed by them, the greater their problems, i.e., lack of accounting data, default frequency, etc. Clearly, a type of agency for a U.S. Small Business Administration — Small Business Investment Company would be useful in Brazil to stimulate the development and growth of small industry. Without such government commitment to small business longer-term capital will continue to be very difficult for such companies to obtain, despite the activities of the BNDE. It seems also desirable to extend the present technical assistance offered small business to include financial planning and control. Many potential lenders find it difficult or impossible to appraise loan applications from small businesses.

PN-AAC-074

\$3.05

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GENERAL SOCIAL SCIENCE

WHO IS DOING WHAT IN INTERNATIONAL BOOK & LIBRARY PROGRAMS; CONFERENCE PROCEEDINGS, 1967

American Library Association
International Relations Office
1967, 88p.

International Relations Office
American Library Association
Washington, D.C.

This conference was held to try to complete the information on what libraries and related organizations are doing and who is doing it. It was known that many organizations, committees, foundations, and government agencies had regular or intermittent programs relating to assistance to libraries overseas, international library associations, training of foreign librarians, employment of U.S. library experts for overseas assignments, and other similar activities. But the information seemed to be fragmentary. To fill in these gaps, this report contains summaries of the reports presented at the conference. Each representative was asked to discuss the current policy, program, and activities in library development of his organization. The organizations reported here are: Library of Congress, National Agricultural Library, National Library of Medicine, National Science Foundation, Peace Corps, U.S.A.I.D., U.S.I.A., Interagency Committee on Books, Pan American Union, UNESCO, U.N., American Association of Law Libraries, American Bar Foundation, American Library Association, International Relations Committee, International Relations Round Table, Council of National Library Associations, Medical Library Association, International Federation for Documentation, International Federation of Library Associations, Asia Foundation, Carnegie Corporation, Council on Library Resources Inc., Ford Foundation, W.K. Kellogg Foundation, Rockefeller Foundation, State University of New York, University of Pittsburgh, Association

of American University Presses, Franklin Book Programs Inc.,
and United States Book Exchange Inc.
PN-AAC-086 \$7.05

**FAMILY LIFE OF LATIN AMERICAN URBAN MIGRANTS:
THREE CASE STUDIES IN BOGOTA**

Flinn, W.L.
1976, 25p.

Land Tenure Center
University of Wisconsin
Madison, Wisconsin 53706

(In Journal of interamerican studies and world affairs, V. 16, No. 3, p. 326-349) (In LTC reprint No. 129) Copies available from above address at no cost.

Estimates of urban growth during the past decade suggest that somewhat less than half of Bogota's population was made up of migrants. To find out who the residents of the pirate or clandestine settlements are and what has happened to them after settlement, the author describes the migration process, family structure, economic, educational and value systems of the residents of three settlements in Bogota. Pirate settlements are subdivisions which are illegal with regard to public service and housing codes. The three case studies indicate that life in the settlements is more complex than is assumed ordinarily. While a majority of the adults are migrants, most of the population under fifteen was born in Bogota. For the most part, the settlement residents have relatively stable families, high aspirations for their children's education, desire to own their homes, and stable employment. However, residents had larger families, lower educational levels, higher fertility, lower family incomes, and lower occupational status when compared to the general urban population. Conversely, when residents are compared with rural dwellers, they had higher total family incomes and equally or better educated children. This may help to explain the attraction of the city and the resulting migration.

PN-AAC-136 \$2.00

**ETHNOGRAPHY OF MIGRATION: BREAKING OUT OF THE
BIPOLAR MYTH**

Uzzell, J.D.
1976, 17p.

Program of Development Studies
121 Sewall Hall,
William Marsh Rice University
Houston, Texas 77001

(In Program of development studies. Paper No. 70)

It is argued that the "bipolar" view of migration, in which migrants are thought of as having a sphere of activity in one locality and a separate sphere of activity in another locality, is a distortion of the experiences of many of the migrants themselves, and as such is a misleading analytical construct. Evidence is given from a village in the Oaxaca Valley of Mexico to illustrate that the economic strategies and supporting social activities of the villagers is at least regional, and probably national, in scope; and that in many cases the decision to change place of residence does not carry the meaning commonly ascribed to it by social scientists. It is suggested further that social scientific conceptualizations of the space of migration is an artifact of the ways in which migrants have been studied (and conversely), and that ethnographic studies of the life histories of both migrants and non-migrants are required for the causes of migration to be understood.

PN-AAC-166 \$2.00

**FROM PLAY LEXICONS TO DISENGAGEMENT SPHERES
IN PERU'S URBANIZATION**

Uzzell, J.D.
1976, 23p.

Program of Development Studies
Rice University
Houston, Texas 77001

(In Program of development studies. Paper No. 72)

A language is proposed and used for describing recent evolution of parts of the socio-economic system of Lima and its hinterland. The basic concept, "plays", refers to courses of action an individual feels possible for himself in a given situation. Building upon that definition, the author describes institutions in terms of the frequency with which a particular play is chosen by a population in a given situation, and significant population segments are identified by the set of instructions they use. It is argued that migrants to Lima, by inventing certain plays and standardizing them, have created an array of alternative institutions for, among other things, housing, manufacturing, credit, and prestige. Through these institutions, the population using them have been able to "disengage" from counterpart institutions (e.g., banks, commercial builders, legal manufacturers, upper-class prestige symbols) participation in which is disadvantageous to them, giving themselves thereby an improved position in the socio-economic system as a whole. It is argued further that this system is, in turn, part of another system that encompasses the hinterland, encouraging further migration, which further strengthens the alternative institutions, creating a deviance amplifying feedback loop.

PN-AAC-168 \$2.00

DEVELOPMENT AND EQUALITY: PARTNERS OR RIVALS

Thiesenhusen, W.C.
1975, 14p.

Land Tenure Center
310 King Hall
University of Wisconsin
Madison, Wisconsin 53706

(In LTC reprint no. 128, also in Solidarity, V. 9, No. 3, P. 7-19)
Copies free from above address

The author opens with his definition of development as economic growth along with a more egalitarian access to income-generating opportunities; it is bound up in and necessitates the general improvement of human capacity and a general reduction of mass poverty and unemployment together with enhanced security. This does not argue against redistribution of income-generating opportunities (like wealth through a land reform or establishment of a stiff inheritance tax) very early in the process of industrialization, but it does mean that reforms must be accompanied by measures that would raise production. In some countries it is conceivable that more growth without more equality is impossible. And if several different paths lead to the same rate of growth, *ceteris paribus* the more egalitarian one would be preferred. One cannot speak dispassionately of income distribution — what the relative shares are, what implications for development might be, and what the relative shares are, what implications for development might be, and what researchable topics remain for the social scientist — without remembering that size distribution of income depends on economic power and any redistribution of wealth implies redistribution of power. This redistribution can come through socialism, some types of mixed economics, etc.. But without dramatic changes in the structure of power, chances for a change in the size distribution of income are dim indeed.

PN-AAC-175 \$2.00

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COGNITIVE VARIABILITY AND ITS SOCIOCULTURAL CORRELATES AMONG THE BAGANDA

Pollnac, R.B.
1975, 21p.

International Center for Marine Resources Development
University of Rhode Island
Kingston, Rhode Island 02881

(In *Ethos*, V. 3, No. 1, p. 22-40)

A test of hypotheses concerning the socio-cultural correlates of cognitive diversity among the Baganda. There has been an increasing emphasis on the investigation of intracultural cognitive diversity in the behavioral sciences. Anthropologists, as well as other behavioral scientists, have presented empirical evidence supporting the view that there is intracultural variation in the way a people organize the world around them. The research here was carried out in two major research areas, a periurban and a rural area, and the data were collected as a part of a socio-semantic survey conducted in Baganda in 1971 and 1972. The analysis examined the degree of variability in triad sort derived kin term similarity coefficients. The similarity coefficient therefore are based on cognitive processes that reflect the differential salience of the attributes used to classify the six kin types. In sum, several hypotheses concerning the socio-cultural correlates of cognitive diversity among the Baganda were tested with positive results. The sources and consequences of this diversity were discussed, and it was concluded that such diversity has its most important consequences in the field of communication. It can be argued further that knowledge of the components of this diversity can be used to construct effective communications.

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ABDUCTION AND STATISTICAL INFERENCE OF INTERACTION PATTERNS: AN ANALYSIS OF DATA FROM PERU, UGANDA, AND IRON AGE FRANCE

Pollnac, R.B.; Hickman, J.M.
1975, 34p.

International Center for Marine Resources Development
University of Rhode Island
Kingston, Rhode Island 02881

(In *Sociologus*, V. 25, No. 1, p. 28-61)

The results of an exploratory application of multivariate techniques toward the delineation of role and/or interaction patterns contained in several types of anthropological data. These data vary from color terminology in Uganda, to opinion items in Peru, to grave goods from Iron Age France. The Peruvian data are examined to determine discriminating characteristics of the overlapping domains of Catholic and Protestant self-identification. The color term data from Buganda (sic) are examined to determine if they manifest systematic patterning which can be related to the differential interaction patterns of individuals occupying various roles. As for the data from Iron Age France, the role of community members was manifested in interaction and identify patterns which can be delineated by investigating the patterning of stylistic elements in the archaeological remains. In conclusion, patterning in the diverse data sets was related to differential interaction in group contexts, and the results were used to generate new hypotheses.

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DEVELOPMENT PLANNING

INSTITUTION BUILDING: INCIDENTS, IDEAS, AND APPLICATIONS; AN EXPERIMENTAL GUIDEBOOK IN SCHOLAR-PRACTITIONER COMMUNICATION

Duncan, R.L.
1975, 81p.

Technical Assistance Bureau
Agency for International Development
Washington, D.C. 20523

Copies available from the Technical Assistance Bureau, TA/PPU/EUI, Room 2669 NS, Agency for International Development, Washington, D.C. 20523

This guidebook contains descriptions of incidents drawn from actual cases of development; comments on those cases written from the perspective of institution-building, and checklists of items the reader might consider in institution-building situations. Appendices present important findings from ten years of research in institution-building, and a bibliography that includes a reference to the basic *Source Book of Institution Building*.

The titles printed below are listed in the bibliography, and are printed here for your convenience.

PN-AAB-988

\$6.50

INSTITUTION BUILDING, A SOURCE BOOK

Blase, M.G.
1973, 335p.

Midwest Universities Consortium for International Activities,
Inc.
200 International Center
Michigan State University
East Lansing, Michigan

Copies available from Technical Assistance Bureau, TA/PPU/EUI, Room 2669 NS, Agency for International Development, Washington, D.C. 20523

Contains a descriptive (annotated) bibliography of the literature on institution-building, plus a compilation of excerpts from leading authors on the substance and definition of key concepts and the micro and macro aspects of institution-building.

PN-AAB-985

\$26.80

INSTITUTION BUILDING AND DEVELOPMENT: FROM CONCEPTS TO APPLICATION

Eaton, J.W. (ed.)

Available *only* from Sage Publications, Inc., 275 South Beverly Drive, Beverly Hills, California 90212.

SEMINAR ON INSTITUTION BUILDING AND DEVELOPMENT, PROCEEDINGS, KATHMANDU, 1971

Axinn, G.H. "A Strategy of Institution Building" (in proceedings)
1971, 200p.

Agency for International Development
Kathmandu, Nepal

(In CEDA study series, Seminar paper no.1)

Includes papers and discussions on the theory and strategy of institution-building in Nepal, including the New Education Plan and the roles of the Panchayat Training Organization and the Centre for Economic Development and Administration.

PN-AAB-987

\$16.00

**NATIONAL EDUCATION RESEARCH AND PLANNING,
1968-1975; FINAL REPORT ON THE MICHIGAN STATE
UNIVERSITY TURKEY PROJECT**

Bohnhorst, B.A.; Case, H.L.; Neff, K.L.
1973, 162p.

Agency for International Development
Ankara, Turkey

Describes a development project, conducted by MSU from 1968-1973, designed to establish a new central planning office within the Turkish Ministry of Education and provide graduate training at MSU for 20 Turkish students. Despite disagreements and delays, the objectives were attained.

PN-AAB-986 \$13.00

**A GUIDE FOR TEAM LEADERS IN TECHNICAL
ASSISTANCE PROJECTS**

Technical Assistance Bureau
Agency for International Development
Washington, D.C. 20523
1973, 106p.

Agency for International Development
Washington D.C. 20523

Copies available from Technical Assistance Bureau
TA/PPU/EUI, Room 2669 NS
Agency for International Development
Washington, D.C. 20523

Discusses the team leader's role in terms of the task environment, institution-building and linkages, collaboration and advising, managing and administering, selecting and guiding team members, liaison functions, development of training programs, and project evaluation.

PN-AAB-990 \$8.50

**PAKISTAN'S NATIONAL INSTITUTES OF PUBLIC
ADMINISTRATION, A NOTE ON INSTITUTION BUILDING**

Jones, G.N.
1969, 7p.

Colorado State University
Fort Collins, Colorado

(In NIPA journal, Dec. 1969, p. 137-144)

Summarizes accomplishments of an AID-sponsored, USC-conducted 1960-1967 technical assistance program designed to build a large-scale complex of training and educational institutions in Pakistan.

PN-AAB-989 \$2.00

**DASP AND THE GENERAL TESTS OF
INSTITUTIONALIZATION**

Siegel, G.B.
1966, 24p.

School of Public Administration
University of Southern California
Los Angeles, California

Attempts to assess whether DASP, a Brazilian civil service agency, meets three general tests of institutionalization and their subsets developed by the Inter-University Research Program in Institution-Building. Concludes that it does not meet some of the criteria associated with the tests of survival, valuation by the environment, and normativeness.

PN-AAB-991 \$2.00

**PROCEEDINGS OF THE REGIONAL CONFERENCE ON
INSTITUTION BUILDING**

Smart, L.F.
1970, 106p.

Utah International Education Consortium
Utah State University
Logan, Utah

Copies available from the Technical Assistance Bureau
TA/PPU/EUI, Room 2669 NS
Agency for International Development
Washington, D.C. 20523

The conference was designed to provide participants with an opportunity to become familiar with institution-building theory and to share the experiences of institution building and technical-assistance practitioners. Its achievement, as summarized by Dr. George H. Axinn, lay in its enunciation of the doctrine of enduring linkages in the world-wide network of higher education and research.

PN-AAB-992 \$8.50

**THE ROLE OF LOCAL INSTITUTIONS AND JOINT
ORGANIZATIONS IN LESS DEVELOPED COUNTRIES AS
PROGRAM INTERMEDIARIES FOR FOREIGN
ASSISTANCE**

Alderfer, E.G.
1971, 44p.

Technical Assistance Bureau
Agency for International Development
Washington, D.C. 20523

(In The servicios of Latin Am., 1942-1965)

The Brazilian Institute of Municipal Administration is a private organization concerned with strengthening the capabilities of local government in Brazil and throughout Latin America. Since 1956 it has been conducting research, developing model codes and ordinances, providing training programs for local officials, offering technical field services, and publishing studies relevant to municipal improvement.

PN-AAB-984 \$3.55

**DEVELOPMENT POLICIES DIRECTED TOWARD SMALLER
FARMERS, FARM WORKERS, AND TENANTS**

Brown, D.W.
1971, 10p.

Department of Agricultural Economics and Rural Sociology
University of Tennessee
Knoxville, Tennessee 37901

(Presented at AID/USDA Agr. Policy Sem., Washington D.C., 1971)

A very frequent dilemma in development planning is how to encourage a dynamic, efficient agriculture and at the same time, ensure that the less-advantaged groups in farming share in the benefits or at least that they are not made poorer by these changes. As part of the cohesive efforts to modernize agriculture, three basic strategies for looking after the interests of disadvantaged groups are considered here: 1) Stress improvement of commercial agriculture, but introduce protective constraints. 2) Initiate positive programs that are designed especially to help the less-advantaged groups stay in agriculture. 3) Stress efficiency in the modernization of commercial agriculture, and rely on "social welfare" instruments outside of agriculture to improve the well-being of low-income farm people. Several specific actions related to each of these strategies are examined for their real, rather than their intended, effects; for example, minimum wage laws, controls on interest rates, ownership of one's own

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holdings, and producer cooperatives. However, in the conclusion the reader is reminded that the special efforts needed to reach the less-advantaged masses have a cost in terms of diversion of ministry funds and personnel from other components of the agricultural sector. Sometimes it may be more rational to improve living levels through means other than agricultural modernization and specialization.

PN-AAB-844

\$2.00

RURAL DEVELOPMENT FROM A DECISION-MAKING PERSPECTIVE

Brown, D.W.
1974, 21p.

Department of Agricultural Economics and Rural Sociology
University of Tennessee
Knoxville, Tennessee 37901

(Presented at 3d South Pacific Commission Regional Conference of Directors of Agr., Livestock Production, and Fisheries, Papua New Guinea, 1974) (In *International Development Review*, v. 17, no. 2, p. 12-16)

Rural development has the dual purpose of stimulating economic growth and helping certain disadvantaged groups. The decision-maker is confronted with a difficult task since these two aims are sometimes at odds with each other. This report suggests a point of departure for diagnosing rural development needs, formulating practical solutions, and choosing appropriate courses of action, geared especially to the decisions that heads of operational agencies have to make and the constraints under which they operate. The author concludes that rural development undertakings — no matter how narrow — should be examined in the broader context of the socio-economic changes taking place, the impact of these changes on families and localities, and the obstacles which prevent people from adjusting. Rural development objectives should be defined clearly in terms of human aspirations and concerns and also of actual capabilities and responses. Practical options to make effective use of limited program and rural area resources should be weighted carefully. Finally, efforts to modernize production, develop places, and help people reach new goals all should be linked.

PN-AAB-847

\$2.00

COMMUNITY ACTION PROGRAMS AND AGRICULTURAL DEVELOPMENT: REFLECTIONS OF THE COLOMBIAN EXPERIENCE

Edel, Matthew
1971, 47p.

Agricultural Development Council, Inc.
630 Fifth Avenue
New York, New York 10020

(Presented at the Seminar on Small Farmer Development Strategies, Columbus, Ohio, 1971)

A review of national community development programs in general, and, specifically, one national community development program: Colombia's *Accion Comunal*. That program has been a modest success. It also points to uses of community action which go beyond what the Colombians attempted. The broad argument of the paper is that the Colombian experience shows that the general empowerment of communities — providing them legal recognition, educational stimulation, and resources—can assist in the development of low-income farming communities. The national administrative reform law of 1958 included provision for recognition of elected Community Action Boards consisting of residents of each district. The government was to permit popular participation through these boards in such development activities as school construction and repair, health

programs, construction of irrigation and drainage systems, low-cost housing, roads and bridges, agricultural improvements, recreational and cultural activities, and organization of cooperatives and labor exchanges. The Community Action Boards spread rapidly throughout most of Colombia. By 1966 an estimated 9,000 Boards had been formed, and half of them were functioning. The national budget appropriated more than 35 million pesos for community projects in 1966, plus a larger sum for funds for grants to the boards. Investment in construction projects organized by the boards was estimated at between 100,000 and 150,000 pesos, with about 60% of the investment provided by government matching funds. Current estimates are that the annual investment has risen slowly over the past five years. Approximately 1,000 schoolrooms are constructed annually by community action boards, as are several hundred feeder roads. However, the community action program has not been a panacea for the development of food production or for the welfare of the rural poor. Total agricultural production in Colombia has not increased dramatically in the period since institution of the program. The real value of output per hectare increased by 38% between 1958 and 1967 in production of yucca, beans, plantains, and brown sugar, and 35% in the production of bananas and cocoa. The per acre value of corn production did not advance, and yields as well as prices declined for potatoes, the principal cold-climate crop. The present unpopularity of community action programs seems to stem from its threat to much of the economic ideology of both business and government. That uneducated and poor peasants can manage their own affairs is an idea that engenders opposition among intellectuals and bureaucrats alike. The community action boards have also functioned as a means of informing the government of social and political grievances. In general, where development of small farms is accepted policy, and resources are made available to farmers in meaningful quantities, community organizations are an appropriate channel. Where resources are withheld, community action will not have massive economic effects, but it plays role in coalitions for structural reform or social revolution. An appendix of this paper presents brief descriptions of community development activities in five Colombian municipalities (townships): Cogua, Pitalito, Tamesis, Contadero, and Cerete.

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PROJECTS OF INTEGRATED RURAL DEVELOPMENT

Mosher, A.T.
1970, 27p.

The Agricultural Development Council, Inc.,
630 Fifth Avenue
New York, New York 10020

(Presented at Seminar on Small Farmer Development Strategies, Columbus, Ohio, 1970)

An analysis and classification of various types of integrated rural development projects and their needs, and presents the author's conclusions concerning the Symposium on Agricultural Institutions for Integrated Rural Development, conducted in Rome in June, 1971, by the FAO and the Swedish International Development Administration. Sections of the paper deal with such questions as the distinction between agricultural and rural development, whether an agricultural development project can best be considered a system or a sub-system, and whether it is more important for development activities to be integrated as opposed to simultaneously available. Next presented are a classification system and a discussion of six major types of integrated development projects, each containing a different combination of elements, but all possessing two common characteristics: limitation to a specific land area, and limitation to elements not already present but potentially effective in the project area. Next follows a discussion of the importance of adjusting types of projects to local needs. The last section discusses seven prob-

lems common to all projects of integrated agricultural or rural development that were discussed in the Symposium: the size of individual projects, their location, meeting the needs of small farmers, the role of the private sector, relating projects to the government structure, project financing and national planning,

and "popular participation" in integrated projects. The author's major impression of the Symposium is that integrated projects have matured enormously in the past twenty years.
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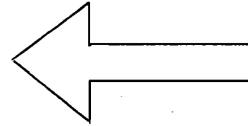
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