TN-AAA-016

# A.I.D. RESEARCH AND DEVELOPMENT ABSTRACTS



Volume 4
Number 4

APRIL 1977

ARC No. 017.1-A265s

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

## A VERSATILE LEGUME

**BAYANI, A Source of Fertilizer, Feed, and Energy for the Philippines**

A legume, described as a good source of green fertilizer, food for animals, firewood, charcoal, and even lumber, is described in a publication by Michael Benge and Hugh Curran. *Leucaena leucocephala* is a legume that can grow to tree-size and is found in many tropical and sub-tropical countries. In the philippines the common or native variety is called "Ipil-ipil or "Santa Elena". A new, improved variety from the University of Hawaii is sometimes called the "Hawaiian Giant" (K-6 in Peru, K-8 in Mexico, and K-28 in El Salvador). The authors of the publication, in a continuing effort to further popularize this tropical legume, have reviewed all data available to them and have condensed information pertinent to present economic developmental trends.

For free copies contact this address *directly*. Copies are not available elsewhere:

Agro-Forestation Division
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Manila, Philippines

## NUTRITION

This issue of the AID Research and Development Abstracts contains abstracts of more than thirty publications on the subject of nutrition whose preparation was *not* sponsored by the Agency for International Development. A.I.D.'s Office of Nutrition considered these publications to be of general value, and therefore obtained copies for distribution free of charge. Copies are available as long as the supply lasts.

For free copies contact this address *directly:*

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

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### INSTITUTIONS IN DEVELOPING COUNTRIES—COPIES FROM AUTHORS

Researchers who desire copies of papers described in this quarterly are encouraged, in accordance with the usual tradition in the scientific community, to send requests directly to authors. Names of these authors and of their institutions are included within the title of each paper abstracted.

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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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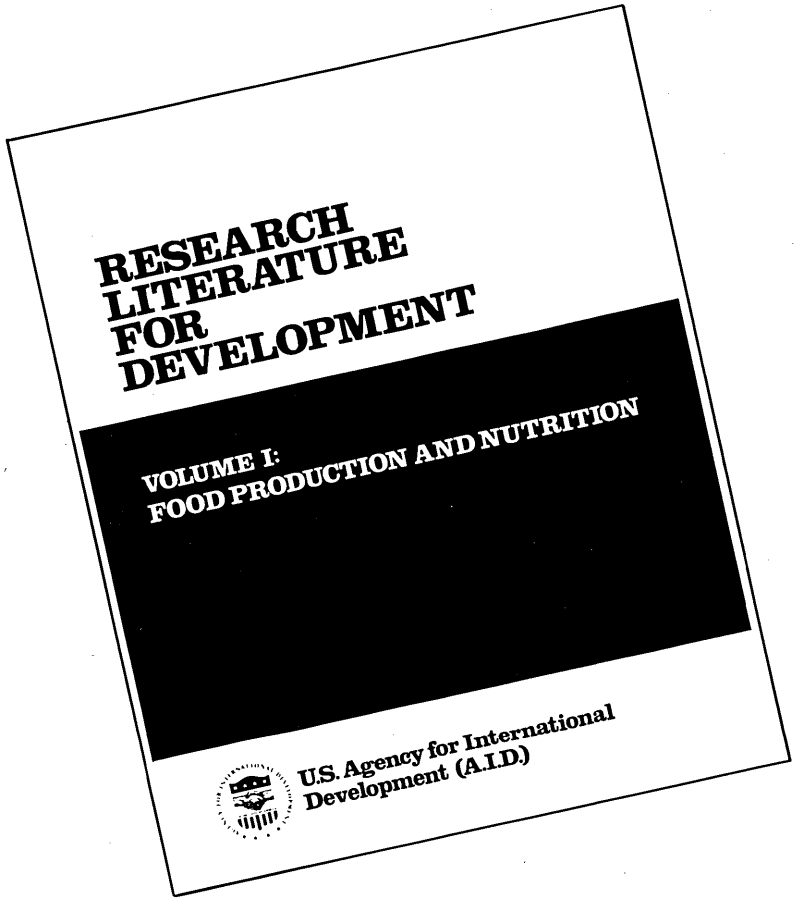
Technical Assistance Bureau, TA/RIG, Editor of ARDA
Washington, DC 20523

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

**JUST ISSUED**

# CATALOGUE OF RESEARCH LITERATURE FOR DEVELOPMENT, Volume I: FOOD PRODUCTION AND NUTRITION




This work indexes a major portion of R&D materials in agriculture and nutrition produced since 1962 under programs supported by the Bureau for Technical Assistance, A.I.D. Approximately 3,500 titles, arranged by AGRIS subject categories, are cited under appropriate descriptors. Author and institutional indexes are provided.

Volume I of the CATALOGUE cumulates titles in agriculture and nutrition abstracted in past issues of A.I.D. RESEARCH AND DEVELOPMENT ABSTRACTSS (ARDA). Volume II, to be issued before the end of 1977, will include R&D titles in health, education, urban development, and selected fields in science, technology, and social sciences.

Copies of the Volume I have already been sent to ARDA recipients who indicated on the *Questionnaire* forwarded in 1975 and 1976 an interest in knowing about R&D publications in agriculture and nutrition. If you have not completed and returned this *Questionnaire,* please do so at this time; and note your interest in receiving a copy of the CATALOGUE. If the *Questionnaire* did not reach you, please advise us to this effect, and of your interest in receiving the CATALOGUE.

# AGRICULTURE

## GENERAL AGRICULTURE

### CROP PRODUCTIVITY—RESEARCH IMPERATIVES (EXECUTIVE SUMMARY)

(101) Michigan State University Experiment Station; Charles F. Kettering Foundation
1975, 40p.

Michigan Agricultural Experiment Station
Michigan State University
East Lansing, Michigan 48824

(Complete proceedings of this volume, 408 p., available as PN-AAC-262) International Conference on Crop Productivity—Research Imperatives, Harbor Springs, Michigan, 1975

The Conference focused on the fundamental biological processes that control productivity of economically important food crops. It was recognized that increased productivity must come with a husbanding of non-renewable resources and that a reduction in food losses indirectly would improve crop productivity by getting food already produced into use. Six discussion groups addressed issues involving: Nitrogen Input; Carbon Input; Water, Soil, and Mineral Input; Plant Protection from Pests; Environmental Stress (air, water, salinity, temperature); and Plant Development Processes. Issues of common concern to and general recommendations of the six groups were: 1) develop mechanisms for rapid and effective transfer of available technology; 2) provide manpower and fiscal resources on a sustained basis; 3) encourage interdisciplinary education; 4) strengthen support for the basic plant sciences; 5) intensify and expand international efforts toward the preservation, conservation, and interchange of genetic resources; 6) broaden the range of parameters in plant breeding research; 7) determine the most efficient balance between non-renewable energy and human labor in relation to increased food supply; 8) develop integrated pest management systems for stable crop production at high levels suited to various styles of agriculture; 9) establish an international center to investigate the inter-relationships among photosynthesis, biological nitrogen fixation, plant improvement, and plant culture; and 10) establish a temperate zone international institute for improvement and culture of labor-intensive food crops.
PN-AAC-274 $3.30

### CROP PRODUCTIVITY—RESEARCH IMPERATIVES (COMPLETE PROCEEDINGS)

Michigan State University Agricultural Experiment Station; Charles F. Kettering Foundation; International Conference on Crop Productivity—Research Imperatives, Harbor Springs, Michigan, 1975
1975, 408p.

Michigan State University
Michigan Agricultural Experiment Station
East Lansing, Michigan 48824

(Executive Summary of this volume, 48p., available as PN-AAC-274)

Included here are some excerpts from an interpretive summary of the conference prepared by the participants. The summary focuses on priorities for research specifically related to the biological processes that control and now limit global crop productivity. *The Resource Base (Land, Water, Energy, Labor).* Enhancement of crop productivity is inseparable from the resource base. The goal of agriculture should be to increase and maintain at high levels the yield of highly nutritious food per hectare of land, per increment of water, per calorie of energy input, per unit of time, while maintaining a high-quality environment. Although more land can be put into production, much of that land is marginal and may require substantial inputs of water and fossil fuel energy to be productive. We must develop research programs for effective utilization and protection of these resources. Billions of dollars have been expended for development of new land resources through irrigation. Meanwhile, little attention has been directed toward increasing efficiency of water usage by crops. That efficiency is 30-40 percent worldwide and is a similarly low value in the U.S. On the other hand, Israel has achieved a remarkable efficiency in water utilization from irrigation that exceeds 80 percent. Soil erosion control. . . is needed. After 40 years of a program directed by the Soil Conservation Service of the U.S. Department of Agriculture, no more than 25 percent of the farm lands are under approved conservation practices. Despite erosion control efforts, losses are estimated at 3.6 billion metric tons of top soil annually, equivalent to 31 metric tons per hectare of tilled land. *Stability of Food Production.* Stability of production at high levels could be improved by nitrogen self-sufficiency in crops, identification of aspects of photosynthesis which limit carbon dioxide input, an understanding of the mechanisms of senescence, ability to predict extreme weather events at crucial times, and stable pest resistance in plants. Weather is the most determinant factor in food crop productivity. Decreased vulnerability of crops to weather uncertainties from season to season and to potential hazards of changing climatic patterns must be sought through genetic improvement, soil, water, and fertilizer management, chemical regulators and cropping systems that efficiently combine space and time. *The Total Food Production System.* The operational approach to maximum productivity has to be more than the traditional *ad hoc* technique. Management must be predicated on a scheme that integrates the entire system. Interacting factors such as crop cultivars, rotations, row spacing, soil nutrients, structure and moisture, temperature, sunlight, plant protection from pests, harvesting procedures, environmental concerns, and public health have led to a complexity that cannot be accommodated without sophisticated management schemes. *Improvement of Nutritional Values.* Proteins in cereal grains and seed legumes are of singular importance. Protein levels and amino acid balances are heritable traits subject to genetic manipulation. Substantial progress has already been made with the development of triticale, high-lysine maize and sorghum, and high-protein selections of rice and barley. *Photosynthesis, Biological Nitrogen Fixation, and Plant Improvement.* These processes can add substantially to the productivity of all food crops. These three areas have received only token attention in crop productivity. The U.S. lags behind other areas of the world in its research emphasis on these three basic areas. In addition, these three areas receive very limited attention at international agricultural research centers, which are predominantly commodity oriented. An international center should be established in the temperate zone to investigate the interrelationships among photosynthesis, biological nitrogen fixation, and new techniques for plant improvement. *Technology Transfer.* Much existing technology relating to agricultural production has not yet been applied. Institutional mechanisms must be developed that insure the collation, interpretation, dissemination, and application of knowledge that is already available. *Manpower, Interdisciplinary Training, International Coordination.* A global assessment of manpower resources available for crop productivity research should be undertaken. Training programs for manpower knowledgeable in the biological processes that control the production of food crops should be given high priority. *Constraints.* There are numerous environmental, socio-politico-economic and institutional disincentives for food production. The most important constraints to achieving food adequacy are the uncertain responses of human political institutions. Losses during production, handling, stor-

age, and delivery constitute another major constraint for food adequacy. It was strikingly apparent in the Conference that there was a deficiency of information available on the fundamentals of plant growth. These include factors affecting top and root architecture and development, the root-soil complex, principles of ion and water uptake, the interrelationship of environmental stresses, the nature of pest resistance, and the action of chemical plant regulators.
PN-AAC-262 $33.85

### UNION CATALOG OF THESES AVAILABLE IN THE LIBRARIES OF ALL THE INTERNATIONAL AGRICULTURAL RESEARCH AND TRAINING CENTERS

Jain, T. C.; Rahman, T. A.; Prasannalakshmi, S.
1976, 180p.

International Crops Research Institute
for the Semi-Arid Tropics (ICRISAT),
1-11-256, Begumpet, Hyderabad-500016, (A.P.) India

Single copies available from T. C. Jain, Librarian, International Crops Research Institute for the Semi-Arid Tropics, 1-11-256, Begumpet, Hyderabad-500016, (A.P.) India

Seven hundred and six entries from the following six centers are included in this catalogue: International Rice Research Institute (IRRI), International Institute of Tropical Agriculture (IITA), Centro International de Agricultura Tropical (CIAT), Centro Internacional de la Papa (CIP), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and Asian Vegetable Research and Development Center (AVRDC). Entries are arranged alphabetically by author, and a detailed, alphabetical subject index also is included.
PN-AAC-270 $14.95

### COMBINED CROP/LIVESTOCK FARMING SYSTEMS FOR DEVELOPING COUNTRIES OF THE TROPICS AND SUB-TROPICS

Sprague, H. B.
1976, 35p.

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

(In Technical Series Bulletin No. 19)

Developing countries should be encouraged to establish farming systems that provide a combination of crop production enterprises and livestock production enterprises. The bulk of the basic food supplies of agrarian nations is produced by many farmers with tiny landholdings. Improved productivity and income for these rural people requires use of new high-yielding, science-based crop and animal production systems tailored to the unique combination of soil, climate, biological, and economic conditions of every locality in every nation. There is need to more fully utilize national resources available to agriculture, including development of livestock enterprises in farming systems that are now largely devoted to the production of crops. Benefits to be derived from including livestock enterprises in farming systems of the tropics and subtropics are many: This allows for more effective use of natural resources of climate, land, soil, and vegetation. Feeding livestock crop residues and by-products to livestock converts them to foodstuffs for human consumption. Livestock produce milk and milk products, meat for sale, and animal power for crop farming. Animal manures provide fertilizer for improving soil productivity. Livestock forage crops grown in rotations to control erosion, weeds, and pests improve soil fertility. And livestock enterprises stabilize seasonal and yearly food production, labor and power requirements, and net farm income. Crop and livestock enterprises should be mutually beneficial when they employ currently available technology. Heretofore the production of grains and certain export crops has tended to monopolize the attention of both country governments and external assistance agencies. However, the current interest in overall agricultural development, with food production as the prime goal or major factor, has improved opportunities for exploiting the advantages of mixed farming systems.
PN-AAC-623 $2.90

### RHIZOCTONIA SOLANI, SPECIAL METHODS OF STUDY

Sinclair, J. B.
1970, 18p.

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

(In Rhizoctonia Solani, Biology and Pathology, edited by J. R. Parmeter, 1970, pp. 199-217)

A comprehensive review of the research literature concerning the media and methods used for isolating and culturing *R. solani*. More than 70 past studies are described. The author's conclusions: *R. solani* appears to be a good organism for exploring chemical tolerance in fungi. Tolerance to fungicides has been established in this fungus, but better techniques and further studies are needed. Tolerance to a larger number of chemicals needs to be determined. A chemical to which strains of *R. solani* are tolerant, and that would overcome some of the disadvantages of PCNB and TCNB, needs to be found. Additional in vitro and in vivo studies need to be made to determine the extent, potential, and nature of this resistance. Effects of prolonged exposure of *R. solani* to these fungicides should be studied. The mechanism of variation in *R. solani* has been reported by Flentje, et al, in *Rhizoctonia Solani, Biology and Pathology,* 1970, edited by J. R. Parmeter. If fungicide resistance is due to mutation, as suggested by Flentje and Stretton (1964) and Ricaud (1965), then definite proof could be obtained by genetical analysis.
PN-AAB-864 $2.00

### DESERTIFICATION: PROCESS, PROBLEMS, PERSPECTIVES; PAPERS PRESENTED DURING A 14 WEEK SEMINAR SERIES

(100) Paylore, Patricia; Haney, R. A.
(101) Arizona University Office of Arid Land Studies
1976, 129p.

University of Arizona
Office of Arid Lands Studies
Tucson, Arizona 85721

These 11 papers focused on the aridization of land discuss the process and problems associated with it. They were delivered during a 14-week seminar series at the U. of Arizona by seven faculty members and four invited speakers. The titles of the papers: Desertification: What, Where, Why, Who (by Patricia Paylore); The Consequences of Fooling Mother Nature; Atmospheric Dust and Surface Albedo: Effects on Desertification; Ecology of Desertification; Segments of a Vicious Circle: Land Degradation and Water Resources; Trends in Desertification: Interrelations between Vegetation, Erosion, and Stream Flow; Desertification of Papagueria: Cattle and the Papago; Changing Climate in the Sierra Pinacate of Sonora, Mexico; Desertification and the Salinity Problem in Australia; Desert Repaired in Southeastern Oregon: A Case Study in Range Management. Some points made by the principal author in the recap of the series of papers: Desertification is a process of environmental change characterized by increasing aridity and intensification of distinct geomorphological processes, dessication and increasing salinity of soils, and a manifest degradation of vegetative cover.

While in some areas of the world this process is probably the result of long-term cimatic changes, in many less developed countries it is the result of well-intentioned but unwise interference with natural water-use and land-use practices; short-term technological inputs produce longer-term problems that tend to accelerate the desertification process. This can be reversed only through enlightened and broad-scale governmental commitments in the affected countries, along with better organized international efforts.
PN-AAC-604 $10.70

## CEREAL CROPS

### THE MILLETS: IMPORTANCE, UTILIZATION, AND OUTLOOK

Rachie, K. O.
1975, 70p.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), 1-11-256, Begumpet, Hyderabad-500016, (A.P.) India

A comprehensive monograph and bibliography on the millets, followed by several pages of statistics and tables. This compilation is based on actual experiences with the millets over several years and an extended survey of the literature. The latter was obtained from a broad array of sources covering the major period of formal documentation of crop technology and research starting in the late nineteenth century to the present. Physical limitations prevent the detailing of techniques and less pertinent facts or findings; rather, the report describes the various types of millet, their history and geographic adaptation, world production, utilization, and outlook.
PN-AAC-271 $5.80

### THE DIFFUSION OF HYBRID MAIZE IN WESTERN KENYA

Gerhart, John
1975, 63p.

Centro Internacional de Mejoramiento de Maiz y Trigo (International Maize and Wheat Improvement Center), Apartado Postal 6-641, Mexico 6, D.F., Mexico

(Based on the Author's Dissertation—Princeton; Abridged at CIMMYT)

The purposes of this study are: a) to determine the pattern of diffusion from 1964 through 1973; b) to determine the influence of environmental factors on adoption as well as the influence of other factors such as farm size, cash crops, off-farm income, work experience, credit availability, formal education, and various types of extension contact; c) to characterize early, later, and non-adoptors of the new maize technology in terms of these soci-economic factors; d) to determine which portions of the "package" of recommended practices associated with hybrid maize are adopted and to what degree; e) to describe the maize industry in Kenya and to place the pattern of adoption in the context of Kenya's rural economic services; f) to consider the costs and benefits to Kenya of developing the new maize technology; and g) to draw conclusions as to why and how this development can be extended and improved. Among these conclusions are that a modest investment in the scientific breeding of maize has produced enormous returns to the government and people of Kenya. Even in those areas in which adoption levels are low, historical and survey data indicate that this has been a conscious process of non-adoption rather than "laggard" traditionalism.
PN-AAC-547 $5.20

### INDIA'S HIGH YIELDING VARIETIES PROGRAMME IN WHEAT, 1966-67 to 1971-72

Vyas, V. S.
1975, 42p.

Centro Internacional de Mejoramiento de Maiz y Trigo (International Maize and Wheat Improvement Center), Apartado Postal 6-641, Mexico 6, D.F., Mexico

From 1966 to 1972, India more than doubled its annual wheat production, from 11.4 million tons in 1966-67 to 26.4 million tons in 1971-72. This has enabled India to increase its share of world wheat production from less than 4% in 1965-66 to nearly 8% in 1971-72. While the annual rate of wheat production increased during that period by 14.27%, the production of other major cereals in India did not increase as rapidly. Rice production increased at an annual rate of only 3.63%, and total cereals by only 5.46%. The phenomenal increases in wheat production resulted in less dependence on imported cereals. Imported cereals decreased from 10.4 million tons in 1966 to 2.1 million tons in 1971. This report discusses in some detail the genesis and progress of high-yielding varieties of wheat in India, the development strategies employed, the planning and coordination of the program, the benefits of the program, and guidelines for future action. One of the principal conclusions presented is that large and small farmers rapidly adopted use of the high-yielding varieties of wheat because of the higher net income its higher yields could provide them. While this might seem over-obvious, the implication is that government pricing and marketing policies affecting farmers and middlemen are an important factor in providing a real economic incentive for farmers to adopt high-yielding varieties of wheat or other cereals.
PN-AAC-268 $3.50

### DIFFUSION OF HYBRID CORN TECHNOLOGY, THE CASE OF EL SALVADOR

Cutie T., Jesus
1975, 28p.

Centro Internacional de Mejoramiento de Maiz y Trigo (International Maize and Wheat Improvement Center), Apartado Postal 6-641, Mexico 6, D.F., Mexico

(Abridged from the Author's Dissertation—Wisconsin at CIMMYT)

An explanation of the factors entering into the adoption of new technology by a representative sample of maize growers in El Salvador. Three aspects are treated. First, the study deals with characteristics of farmers and some of the socio-economic aspects of the environment in which they work and live. Second, it defines farm characteristics. Third, it explains and analyzes the relative impact and coverage of national agricultural policies. The main task of the study if to use primary and secondary data in order to explain those factors affecting the adoption of new technology. The primary data used consist of field interviews from a sample of maize growers selected at random. In brief, it was found that while agroclimatic factors and farm size are influencing nitrogen use and the former is playing a strong role in the pattern of hybrid adoption, it appears that more credit and better access would promote the use of fertilizer, while easier access to hybrids could speed their wider use.
PN-AAC-267 $2.30

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Example: PN-AAB-000

# AGRICULTURE

## ADOPTION OF HYBRID SEEDS AND FERTILIZERS AMONG COLOMBIAN CORN GROWERS

J. Homberto Colmenares
1975, 29p.

International Maize and Wheat Improvement Center
Apartado Postal 6-641, Mexico 6, Mexico

Summarized in this report are the results of a study of 738 maize producers in Colombia. The study completed in 1975, is based on survey work conducted in 1973. Its purpose was to establish the extent to which various categories of farmers adopt improved technology in the form of hybrid seeds, chemical fertilizers, or both. The farms were categorized into low, intermediate, and high-altitude zones. The findings showed that services concerned with the distribution of technical assistance were provided essentially to the large growers of Zone 1 (low land), while extension services which were not necessarily connected to credit were given to small and subsistence producers. Over 32 percent of the large farmers growing maize in pure stand in Zone 1 received both credit and technical advice; another 36 percent of those farmers reported receiving only one of these services; and 32 percent used neither credit nor technical advice. The corresponding figures among the large farmers in Zones 2 and 3 were 7, 20, and 73 percent, respectively. Among all small and medium farmers growing maize in pure stand, 5 percent received technical advice and credit, 16 percent received only one or the other, and 79 percent indicated they received neither service. The data showed relatively large yield differences between farmers using the credit and technical services and those not using them. The main conclusion drawn from direct interviews with farmers in the three zones was that adoption levels are generally low. The level of adoption of fertilizer in Zones 1, 2 and 3 was 26, 10 and 18 percent, respectively. The level of adoption of hybrid seeds was 36, 18 and 7 percent respectively. High adoption levels occur mostly in Zone 1 among growers with favorable characteristics of size, tenure, topography, and higher levels of formal education. These are also the farmers with greater access to specialized services such as credit and professional advice. However, a relatively large proportion of adopters in the large-size group did not receive these services. Hybrid adoption was highly related to the use of credit. Other things equal, farmers in Zone 1 were 44 percent more likely to be using hybrids if they were also using credit. The study established that policy instruments and agroclimatic differences do affect adoption of maize technology among different farmers. However, the evidence also suggested that the policy variables, credit and technical advice, were a part of the adoption package; these services seemed to improve the opportunity for adoption, but their presence or absence may not explain adoption of hybrid maize seeds or fertilizers. There were clear differences between zones, but differences within Zone 1 were larger than those between zones. Further research is needed among producers in Zone 1 to determine the reasons for such differences and to establish the role of policy instruments. This would improve the knowledge of agricultural economics in Colombia, and provide a better base for future policy decisions.

PN-AAC-266 $2.40

## THE ADOPTION OF NEW BREAD WHEAT TECHNOLOGY IN SELECTED REGIONS OF TURKEY

Demir, Nazmi
1976, 33p.

Centro Internacional de Mejoramiento de Maiz y Trigo
(International Maize and Wheat Improvement Center),
Apartado Postal 6-641, Mexico 6, D.F., Mexico

(Edited and abridged by CIMMYT)

A close look at the adoption of the new wheat technology, emphasizing high yielding seeds and chemical fertilizers. The study's specific objectives were to see to what extent farmers have adopted the new wheat seeds, applied chemical fertilizers to wheat, and followed other agronomic practices recommended to them; to identify and quantify association among adoption of high-yield varieties and fertilizer and selected factors related to the farmer, the farm and government policy; and to examine the extension system, credit and input supply situation, and market conditions as they relate to the adoption of new wheat technology. To carry out these objectives the study draws heavily on data obtained through regional samples consisting of 800 farms with different characteristics. Among the conclusions are that there are many gains from the new wheat technology from which the country can benefit, and thus research must be given priority in the overall efforts by the state. To achieve the maximum yield potential from the new seeds, timely and proper seeding is necessary and the farmer should be supplied always with certified seeds of reliable quality. Farmers' membership in an agricultural organization has been found to increase new seed adoption and fertilizer use. Simple calculations indicate that if all traditional varieties are replaced by high-yield varieties and if a modest yield level of 2 to 2.5 tons can be reached, then the three coastal regions alone would supply almost one-third of the nation's needs from the existing amount of land.

PN-AAC-265 $2.75

## REPORT OF MAIZE INVESTIGATIONS, INSTITUTE FOR AGRICULTURAL RESEARCH, AHMADU BELLO UNIVERSITY

Webster, O. J.
1967, 46p.

U.S. Department of Agriculture
Agricultural Research Station
Washington, D.C. 20250

The maize improvement research conducted at Samaru, Nigeria, includes several programs designed to develop high-yielding varieties or hybrids. One main objective is to develop maize which, when planted early in June, will tassel in early August and remain standing until mid-October, so that the moisture content will be low enough for the maize to be stored. Root lodging is a major problem in maize production because of the severe tropical storms normally occurring in August and September. The brachytic gene is being incorporated into the seed populations to improve resistance to root lodging and stalk breaking. The opaque-2 gene is also being incorporated to improve the protein balance of the grain by increasing the lysine content. The report presents daily rainfall statistics for 1967 in Samaru, and also monthly figures for the maximum and minimum termperatures and relative humidity. Breeding nursery activities are discussed, and the results of the national zonal trial are presented.

PN-AAC-393 $3.80

## DEVELOPMENT AND SPREAD OF HIGH-YIELDING VARIETIES OF WHEAT AND RICE IN THE LESS DEVELOPED NATIONS (4TH EDITION)

Dalrymple, D.C.
1974, 87p.

U.S. Department of Agriculture
Economic Research Service
Washington, D.C. 20250

(In Foreign Agriculture Economic Report No. 95) (Revises and expands previous publication, Imports and Plantings of High-yielding Varieties of Wheat and Rice in less Developed Nations, 1972)

This bulletin revises and expands a previous publication, *Imports and Plantings of High-Yielding Varieties of Wheat and*

*Rice in the Less Developed Nations,* issued as FEDR-14 in February 1972 by the USDA in cooperation with the U.S. AID. The statistical portion of this present edition covers the eight crop years from 1965/1966 through 1972/1973. The latter crop year preceded the world fertilizer shortage—the effects of which will not become apparent until data on the 1973/1974 crop year are published. The use of high-yielding varieties (HYVs) of wheat and rice expanded sharply in the developing nations during the years covered by this report. The development and spread of these varieties is reviewed and documented here in statistical terms. Major emphasis is placed on semi-dwarf wheat varieties developed at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, and on semi-dwarf rice varieties developed at the International Rice Research Institute (IRRI) in the Philippines. These varieties came into wide use in the 1965/1966 crop year. As of 1972/1973, the HYV wheat and rice area in non-Communist countries excluding Mexico and Taiwan, totaled about 80.2 million acres (32.5 million hectares). Of this, about 41.6 million acres were wheat and 38.7 million acres were rice. In addition, over a million acres of rice were found in Latin America (excluding Cuba). Nearly all of the HYV area was in Asia. Within Asia, over half of the HYV area was in India. Altogether, the HYVs accounted for nearly 35 percent of the total wheat area and 19.5 percent of the total rice area in non-Communist Asia. Elsewhere, nearly 2.5 million acres of HYV wheat were planted in North Africa, and some HYV rice was beginning to be planted in other areas of Africa.
PN-AAC-616 $7.20

### CORN FORTIFICATION, A FIELD DEMONSTRATION MODEL; ANNUAL REPORT, 1972/1973

(101) Institute of Nutrition of Central America and Panama 1973, 23p.

Pan American Health Organization, Division of Microbiology, Institute of Nutrition of Central America and Panama (INCAP), P.O. Box 1188, Guatemala, Guatemala, Central America

(Research summary)

A status report of a corn-fortification demonstration project in the village of Santa Maria Cauque, Guatemala, during the second year of a five-year project. The purpose of the project is to make fortified corn flour for use in tortillas, persuade the villagers to use this flour, and assess the nutritional effects of its use by monitoring certain health characteristics of families who have been using the fortified flour and those that have not been using it. What the corn flour is fortified with is not stated. However, the fortified and non-fortified tortillas are being randomly sampled each month and analyzed to determine how much protein, total free lysin, and nitrogen they contain. The fortified tortillas are reported to contain 10.5 grams of protein and 497.8 mg percent of free lysin, compared to 8.4 grams of protein and 139.5 mg percent of free lysin in the non-fortified tortillas. Many village families are reluctant to use the fortified corn flour. After 73 weeks of the fortification program, about 40% of the families are using it, and 45% are not collaborating at all. (The other 5% are evidently confirmed vaccillators.) The measurement of effects of the fortified corn flour is focused on pregnant women, newborn infants, and small children. Newborn infants of mothers with good consumption of fortified tortillas have averaged 200 grams more in weight. Work is also proceeding in a study of the anthropometry and mortality in the control village of Santo Domingo Xenacoj.
PN-AAC-321 $2.00

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

### CORN FORTIFICATION, A FIELD DEMONSTRATION MODEL; ANNUAL REPORT, 1974/1975

(101) Institute of Nutrition of Central America and Panama 1975, 72p.

Pan American Health Organization
Division of Environmental Biology
Institute of Nutrition of Central America and Panama (INCAP), P.O. Box 1188, Guatemala, Guatemala, Central America

(Research summary)

Corn fortified with 8% soy bean flour (50% protein) and 0.125% L-lysine HCl is improved in its biological value. It was thought that if this corn were consumed by persons living under natural conditions, a positive biological effect on the growth pattern of children, and on morbidity and mortality would be observed. To test this hypothesis, the corn consumed since June 1972 by the villagers of Santa María Cauqúe, Guatemala, was fortified. Strong indicators provided by the research findings showed that it had been beneficial in reducing the infant mortality by 50%. Second to fifth-year mortality also clearly had been reduced, amd morbidity during weaning had been lowered by 33%. These changes appear to be independent of socio-economic class. Even though a significant effect on postnatal growth was not evident, a positive tendency toward better growth increments was found in children 3 to 5 years old. No change in fetal growth was found; however the dietary intake of pregnant women was improved especially during the first six months of pregnancy. So far, there has been a very beneficial effect on the children's health. It is proposed that this project be continued, to increase the level of fortification to 10% and to find positive changes in other nutritional parameters.
PN-AAC-322 $6.00

## FARM MECHANIZATION

### EVALUATION OF FACTORS AFFECTING THE RATE OF ADOPTION OF IRRI SMALL FARM EQUIPMENT

Becker, A. L.; Butcher, W. R.; Feise, C. F.; Ulinski, C. A.
Washington State Agricultural Economics Department
1975, 125 p.

Agricultural Economics Department
Washington State University
Pullman, Washington 99163

(Research summary)

A study of mechanization on small rice farms in the Philippines. It included all phases of the mechanization process from research and development to manufacturing, distribution, adoption on farms, economic adjustments and adaptations and government policies. Objectives were: 1) to evaluate the extent to which the IRRI agricultural machinery development program is helping to bring about mechanization in the Philippines; 2) to identify political, social, economic, and cultural conditions which have encouraged or inhibited the adoption of small-scale mechanization in the Philippines; 3) to assess the positive and negative socio-economic impacts of mechanization on small farms; and 4) to determine the kinds of problems that may be encountered in both domestic and international transfer of technology. From the findings, recommendations were made to continue the IRRI program in mechanization for small rice farms with more emphasis on: 1) developing and introduction smaller and less expensive implements and machines, 2) integrated systems for producing more than one crop per year on existing lands, and 3) improving national capability for extension activities. The Philippine government also is encouraged to increase and improve extension/education programs, assistance and supportive policies; conduct manpower and employment

analyses; and extend availability of credit to small farms and businesses.
PN-AAC-133 $10.40

### RICE MACHINERY DEVELOPMENT AND MECHANIZATION RESEARCH; SEMI-ANNUAL PROGRESS REPORT NO. 21, JULY-DECEMBER, 1975

International Rice Research Institute (IRRI)
1976, 66p.

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

(Research summary) Copies available upon request at above address. A copy of a bibliography listing other departmental publications is also available.

Accomplishments during the year reported include: development of a low-cost gravity fed, manually pushed applicator for injecting water solutions of fertilizer and insecticides into the plant root zone in puddled fields; development of a manually operated rubber diaphragm pump which can lift 190-200 liters/min. at 1 m head; continuation of work on the development of a 17 hp. four-wheel tractor utilizing a lightweight, air-cooled diesel engine and standard automotive transmission components; investigation of major revisions of the axial flow thresher to improve cleaning performance and reduce production costs; continuation of a study of the effects on depth of hard pan with different land fillage systems in wetland fields; a study of the power tiller industry; continuation of the evaluation of the economic and technical characteristics of rice milling units and farm-level post-production systems; and a new USAID/IRRI Industrial Extension Contract, focusing on extending IRRI machinery design to manufacturers worldwide.
PN-AAC-182 $5.50

### RICE MACHINERY EQUIPMENT AND MECHANIZATION RESEARCH; SEMI-ANNUAL PROGRESS REPORT NO. 20, JAN.-JUNE, 1975

International Rice Research Institute (IRRI)
1975, 81p.

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

(Research summary) Copies of this report and of a bibliography listing other publications available at above address. For additional details write to Dept. of Agricultural Engineering, at above address

The objective of the IRRI rice equipment development program is to increase the income and welfare of small rice farmers by increased yields, removal of resource constraints, reduction in field and post-production losses, increased cropping intensity, and improvements in the quality and value of agricultural products. The IRRI design and development projects conducted during this reporting period consisted of eleven concerned with field machinery: steering clutches for a 5- to 7-hp tiller, an 8- to 14-hp tiller, a small four-wheel riding tractor, a deep-placement liquid injector, a deep-placement granule applicator, water jet pumps for lowlift applications, a tubular pump, a verticle-axle windmill, modifications to an axial-flow thresher, and a stripper harvester. Two other development projects concerned a solar heat collector for an IRRI grain dryer and improvements to a milling machine. Four projects involving mechanization research were concerned with a comparative evaluation of different threshers in the Philippines, compacted soil studies, an engineering training course, and a mechanization workshop. Work on mechanization systems was conducted in five subject areas: mechanizing upland cropping operations, cost budgets, farm-level rice post-production systems, marketable surplus, and mill-level rice post-production systems. With the expanded IRRI activities and worldwide interest in the manufacture of IRRI-developed machines, the machinery design program has been organized along more formal lines. The new organizational structure will permit better screening and evaluation of new projects, and will result in better feedback from end-users and manufacturers of the machines.
PN-AAC-216 $6.70

## FERTILIZERS

### LIMING OF HIGHLY WEATHERED SOILS OF THE HUMID TROPICS

Amedee, Gaston; Peech, Michael
1975, 8p.

Cornell University, Department of Agronomy
Bradfield Hall
Ithaca, New York 14853

(In Agronomy paper no. 1113)
(Based on the first author's dissertation, available in full: PN-AAA-952)

The validity of the current practice of using KCl-extractable aluminum for evaluating the lime requirement of acid tropical soils was examined using Ap and B2 horizons of highly weathered soils from six different locations in Brazil, Colombia, and Puerto Rico. The amount of Al (III) removed even upon exhaustive extraction by 1 N KCl greatly underestimated the amount of $CaCO_3$ that was found to react with the soils upon equilibration of the soils with an excess of $CaCO_3$ at the partial pressure of $CO_2$ of the air. The exchange acidity as determined by the $BaCl_2$-triethanolamine method, however, was found to agree closely with the maximum amount of $CaCO_3$ decomposed by the soils, especially in those that were known to contain aluminous chlorite. Contrary to expectation, the cumulative amounts of $Ca^{2+}$ removed, upon successive extractions with water, from the highly weathered soils of the humid tropics were found to be smaller than that removed from a New York soil. The concentration of $Ca^{2+}$ in the aqueous extracts ($Ca^{2+}$) was found to follow the relation: $(Ca^{2+}) = K\Theta/(1 - \Theta)$ in which $\Theta$ is the degree of $Ca^{2+}$ saturation of the soil and K is the hydrolysis constant. There was no indication of fixation of $Ca^{2+}$ into nonexchangeable forms.
PN-AAC-527 $2.00

### CAN ORGANIC MANURES IMPROVE CROP PRODUCTION IN SOUTHERN INDIA?

Ames, G. C. W.
1976, 5p.

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

(In Compost Science, v. 17, No. 2, pp. 7-11)

Crop yields on farms surveyed in southern Karnataka State, in southern India, responded well to applications of organic manures. Paddy and sugar cane received the largest applications of organic manures. The amounts of organic manure applied to paddy fields by rice farmers varied from 2.5 to 64 one-half-ton cartloads per acre, averaging 17 cartloads for paddy and 38 cartloads for sugar cane. Maximum average yields of 14 quintals per acre for paddy were obtained with 21-30 carloads of manures. For ragi, maximum yield was 3.4 quintals per acre with 11-20 cartloads. For jowar, maximum yields were 8.5 quintals per acre with 11-20 cartloads. For maize, maximum yields were 19 quintals per acre with 21-30 cartloads. For peanuts, maximum yields were 7.6 quintals per acre with 11-20 cartloads. For sugar cane, maximum yields were 33 tons per acre with 11-20 cartloads of

organic manure. The correlation of organic manures with levels of other inputs, such as fertilizer, pesticides, and irrigation, was not known. Thus the results need to be interpreted with considerable caution. A more detailed study of farm-level yield response to organic manure is required before definite conclusions can be drawn.
PN-AAB-959 $2.00

## FISHERIES

### INGESTION OF DETRITUS BY THE LAGOON PELAGIC COMMUNITY AT ENIWETOK ATOLL

Gerber, R. P.; Marshall, Nelson
1974, 11p.

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

(In Limnology and Oceanography, v. 19, no. 5, p. 815-824)

The gut contents of *Undinula vulgaris* (a calanoid copepod) collected from Eniwetok lagoon consisted of about 95% detritus with only 2% of the gut material flourescing as chlorophyll. That of *Oikopleura longicaudata* (a larvacean) consisted of about 89% detritus with only 6% flourescing as chlorophyll. By contrast, the gut contents of the calanoid copepod, *Acartia tonsa,* from Narragansett Bay, Rhode Island, consisted of about 34% detritus with 36% of the gut material flourescing as chlorophyll. The remaining material in the gut of all these organisms included various microorganisms and diatom frustules. Plankton-feeding fishes from behind a reef and island were found to have consumed both zooplankton and detrital algal fragments. The higher levels of particulate carbon and nitrogen in the lagoon, which had a lower C:N ratio than found in the incoming oceanic water, indicated that reef detritus enriches the lagoon environment.
PN-AAC-149 $2.00

### LUDDITES AND FISHERMEN: A NOTE ON RESPONSE TO TECHNOLOGICAL CHANGE

Gersuny, Carl; Poggie, J. J.
1974, 12p.

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

(In Maritime Studies Management, v. 2, p. 38-47)
(In Marine reprint no. 32)

Technology as knowledge and means for exploitation of the environment has approached in many areas the limits imposed by the finite nature of the environment. The trawlermen's charges against the overkill of the foreign factory fleets are recognized increasingly as being well founded. Their advocacy of a 200-mile limit thus is pointing to an important concomitant of technological innovation, the need for social innovation. Unrestrained use of technology poses many dangers in diverse areas of human life and is being discredited. In fisheries technology, the danger of the unregulated use of the factory fleet technology may be the end of fishing, as maximum sustainable yields are exceeded more readily. The need to restrict all nations in the application of increasingly efficient technologies to conform to the limits of the resource being exploited is exemplified here in the study of several New England fisheries. The relationship between fishing technology and resources has reached the point at which there no longer is the luxury of trial-and-error solutions.
PN-AAC-150 $2.00

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

### ECOSYSTEMS MODELING: ECONOMIC CONSIDERATIONS FOR A PERUVIAN COASTAL FISHERY; A.I.D. TECHNICAL SERVICES PROJECT

Kremer, J. N.; Sutinen, J. G.
1975, 49p.

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

(In Marine memorandum no. 39)

Mechanistic simulation models of ecological processes are becoming useful tools for the study and management of complex natural systems such as upswelling coastal regions. The goal of this cooperative project was to develop such a model, which would provide working experience with the methods and serve as a basis for future model development in Peru. This report discusses briefly the ecological assumptions and mathematical methods used in the model. The model currently runs satisfactorily, although its simple nature precludes extensive comparison with detailed, observed data. A number of suggestions for future modifications are presented. In addition, tentative, short-term and long-term programs of economic research were drawn up. The short-term program calls for a study of artisanal fishery in order to make recommendations for the development of the fishery. The long-term program still is not clear though probably will entail economic research required for the proper development and management of the exploitation of Peru's fishery resources.
PN-AAC-151 $4.05

### RED CRAB PROCESSING-WASTE AS A CAROTENOID SOURCE FOR RAINBOW TROUT

Kuo, H. C.; Lee, T. C.; Kamata, T.; Simpson, K. L.
1976, 5p.

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

(In Alimenta, v. 15, p. 47-51)
(In Proceedings, 4th Internat'l Symposium on Carotenoids, Berne, 1975)

The dried red crab waste contained 27.5% protein, 13.8% crude lipid, and 0.008% carotenoids of which 95% was in some form of astaxanthin. Rainbow trout were fed diets consisting of 20% whole crab waste or a pigment extract from crab waste adsorbed on a commercial trout ration. The fish fed the pigment extract containing 0.2 mg of carotenoids/g diet were highly pigmented after seven weeks. The fish fed the 20% crab meal contained a much lower level of astaxanthin in the skin and flesh than would have been expected on the basis of the level of dietary carotenoids. It was concluded that red crab waste could be used for the pigmentation of trout.
PN-AAC-152 $2.00

### SEAWEEDS AS A RESERVOIR OF CANDIDA YEASTS IN INSHORE WATERS

Seshadri, R.; Sieburth, J. M.
1975, 13p.

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

(In Marine Biology, v. 30, p. 105-117)

The yeast populations on nine species of seaweeds and in seawater were estimated by cultural methods over a 16-month period in Narragansett Bay, Rhode Island (USA). Maximal numbers oc-

curred on rhodophytes and a chlorophyte, while the lower numbers on phaeophytes were attributed to the release of inhibitory polyphenolic materials. All divisions of algae showed a similar seasonal variation in yeast populations, correlated with trends in solar radiation and water temperature which would affect both the host and its microflora. The exposure of intertidal algae to unseasonable air temperatures apparently has a detectable effect on their microflora. The population changes in the water surrounding the seaweeds paralleled those on the plants. Only colorless yeasts of the genus *Candida* were observed, except for brief occurrences of the pink yeast *Rhodotorula* in late spring, when it accounted for 3 to 35% of the yeast community. Ninety-five percent of the 362 representative isolates were strains of *Candida*. The published properties of the 84 species accepted in the genus *Candida* were compared with those of the marine isolates using numerical analysis. There were 7 groups: 1 solely of named species, 3 small groups with both named species and marine isolates, and 3 large groups with only one or two named species that contained 75% of the seaweed and seawater isolates. An apparent successional sequence for three groups may be due to differences in their biochemical activity. The same three groups were preferentially enriched by five of the algal species. The role of this persistent yeast population as a reservoir of inshore yeasts is duscussed.
PN-AAC-153 $2.00

### A NOTE ON THE FUSION OF STATUS SYSTEMS

Spaulding, I. A.
1974, 26p.

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

A fusion of status systems as reflected in occupations, was examined in a fishing village of western Puerto Rico. Fishery is regarded as the occupation of the village household heads prior to the availability of occupations contingent upon incorporation of the village into aspects of a commercial-industrial way of life. Businessmen, officials, and laborers, as well as fishermen, encompass the range of current occupations examined among informants in the village. Businessmen, officials, and fishermen identified more strongly with their own occupations than with other occupations, while laborers did not. Over all, informants identified most strongly with the traditional occupation of fishing; yet, in hierarchy based on occupation and monthly household income, fishermen ranked third from the "top", a position held by businessmen who did not fish on a part-time basis. The correlation coefficient between the rank order of occupations based on status and that based on identification with the occupational hierarchy was 0.40. The relationships are interpreted as indicating that the fusion of status systems is not well-established or integrated into the lives of the informants. The procedures followed are usable in small community settings for analysis of status structures.
PN-AAC-154 $2.15

### OCCUPATIONAL IDENTITY AND SOCIO-CULTURAL CHANGE IN AN ARTISAN FISHING TRADITION

Spaulding, I. A.
1974, 69p.

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

The exploration of a technique for measuring the relative prevalence of two different socio-cultural structures in a community. The subject matter examined is the orientation of household heads to occupations; the setting is one in which commercialization is fusing with a non-commercial artisan fishing tradition, some aspects of which have disappeared. The data reflect change in the structure of the local status system, which embodies elements of the traditional and of the commercial-industrial ways of life. In addition, orientations to occupations reflect predominance of commercial-industrial characteristics, but the traditional value system is more prevalent, on the whole, than the commercial-industrial value system. Data suggest that in the course of people's acceptance of comprehensive change in the occupations of a way of life, images of ideal role performers change before orientations to role change, and that both of these change before the value structure of the way of life changes. Fishing, once an almost exclusive occupation of a traditional way of life, is assuming a middle-range position in the diversity of occupations and emerging status system of the commercial-industrial way of life.
PN-AAC-155 $5.70

### SPACE-TIME USE AND TECHNOLOGY TRANSFER

Spaulding, I. A.
1974, 30p.

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

Fishermen in a western Puerto Rican fishing village were studied to ascertain characteristics which supported or resisted technological change in their fishing operations. Most factors were related to the community's modernization. In this transition, change could be either supported or resisted by family and friendship groups, by individual personality, by a person's identification with the area in which he lived and his relationship to it, and an individual's social and personal values. Economic motivation tended to support change. A person's evaluation of his activity, status, or situation as adequate evidenced resistance to change. Hostile, deterring responses to change derived from threat or deprivation. In addition, proneness toward technological changes in fishing operations was discerned as related to allocations of space and time use for fishing as well as to maintaining enough catch to achieve status expectations in a commercially oriented developing status system. Alteration of the work rhythm with "Large boats and adequate equipment" stood to have reorganizing effects on family and economic institutional structures of the fishermen in the community.
PN-AAC-160 $2.50

### TECHNOLOGICAL CHANGE AND SPACE-TIME USE IN AN ARTISAN FISHING OCCUPATION

Spaulding, I. A.
1974, 30p.

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

"Artisan fishermen" is a term applied to fishermen who rely more on craft skills and animate power than on mechanization and inanimate power in their occupational activity; for them living is characteristically at a subsistence level. The purpose of this research was to examine relationships between use of space and of time in an occupational activity and technological changes related to that occupational activity. The hypothesis examined was that technogical change can accompany alterations in orientation to and use of space and time related to an occupational activity. Perspective on space-time orientation and use of space and time related to an occupational activity. Perspective on space-time orientation and use is taken with the following concept of a social system: human organisms mutually involved and synchronized with each other and a given environmental con-

text. This study was conducted in a fishing village on the west coast of Puerto Rico. Data were secured by interview; a total of 40 interviews was made. The data presented here are from interviews with 27 artisan fishermen, constituting 67.5% of the persons interviewed; 32.5% were engaged in non-fishing occupations.
PN-AAC-161 $2.50

### GENERALIZATIONS ON THE FISHERIES POTENTIAL OF CORAL REEFS AND ADJACENT SHALLOW-WATER ENVIRONMENTS

Stevenson, D. K.; Marshall, Nelson
1974, 10p.

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

(In Proceedings, 2d International Coral Reef Symposium 1., Great Barrier Reef Committee, Brisbane, p. 147-156, October 1974)

Some tentative impressions are derived from available, scattered literature concerning the fisheries potential of coral reefs and adjacent shallow environments. The standing crop of fish populations on reefs is very high, sometimes as much as five to fifteen times higher than crops on representative North Atlantic fishing grounds and twice the average standing crop typical of temperate lakes, but obviously the reef crop is comprised of many forms dependent on surrounding areas. Harvests from four island fisheries on reefs and their surrounding range from 0.5 to 5.0 grams wet weight per square meter per year. Yield per unit effort may reach 5000 kg/man/year. Although the standing crop and harvests may be substantial around the reefs, the development of the fisheries is encumbered by the diversity of the species, the relative abundance of small fishes, and the restriction imposed on gear by the environment. There is a difference of opinion and a lack of substantive work on the sustained yields that might be harvested from reef environments which are notably productive but closed ecosystems. The possibility that yields may be enhanced when the trophic pathways become rechanneled within the ecosystem in response to a fishery merits further consideration. Management schemes to prevent resource depletion should be the focus of further study.
PN-AAC-162 $2.00

### ARTISANAL FISHERIES IN COSTA RICA

Pollnac, R. B.
1974, 8p.

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

(In Anthropology Working Paper No. 3)

A short, descriptive report covering the physical features of the Costa Rican coast; marine species utilized; the fishermen; production; artisanal fishing methods; fishing organizations and institutions; the marketing and distribution sector; plans, programs, and government involvement; and the potential for development. Artisanal fishermen produce a significant amount of fish classified as "white" fish, shark, lobster, mollusk, and turtle. The proposed FAO/BID project will facilitate the development of artisanal fisheries around the Gulf of Nicoya. Other cooperatives probably will enhance the development of artisanal fisheries in other sections of the Pacific Coast and satisfy the increased demand. An artisanal fishing cooperative with technical assistance and a minimum of processing and distribution equipment probably would help increase production of marine products on the Caribbean Coast where demand already exceeds supply. Further potential for development is seen in the area of mariculture, as indicated by experiments in mussel culture.
PN-AAC-269 $2.00

### ARTISANAL FISHERIES IN PANAMA

Pollnac, R. B.
1975, 21p.

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

(In Anthropology working paper no. 5)

A description of pertinent characteristics of selected concentrations of artisanal fishermen in Panama. They range from groups of unorganized individualistic fishermen to highly organized fishing cooperatives. The equipment used extends from motorless dugout canoes and handlines to motorized fiberglass boats and monofilament gill nets. Among the characteristics described are: numbers of cooperative and independent fishermen; boats and motors used; types of pier/dock; existence of cooperative building or store and the presence of running water, electricity, ice-chests, electric cold rooms, freezers, freezing plant, ice plant, dryers, and vehicles; total production; and local population. Small groups of fishermen and/or cooperative representatives were interviewed, and data from these interviews along with observations and previously published data are summarized in this report. Because of a FAO/BID project, conditions in the various locations are expected to change a great deal. The project consists of reorganizing and modernizing a number of fishing cooperatives on both coasts, as well as technical assistance.
PN-AAC-163 $2.00

### THE SOCIO-CULTURAL CORRELATES OF FISHING AS A SUBSISTENCE ACTIVITY

Pollnac, R. B.
1974, 12p.

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

(In Anthropology Working Paper no. 4)

An examination of the socio-cultural correlates of the fishing mode of subsistence. Its purpose is first, to facilitate understanding of fishing as a means of adaptation; second, to generate hypotheses to be tested by further field research; and third, to predict potential socio-cultural strain when the principal subsistence activity is being shifted either toward or away from fishing. The data on which this paper is based are drawn from two principle sources, Murdock's *World Ethnographic Sample*, and Murdock's *Ethnographic Atlas*. The correlates analyzed are the distribution of fishing societies; division of labor; co-occurrence of fishing with other subsistence activities; settlement patterns; community organization, kinship, and marriage patterns; social stratification and political organization; co-occurrence with other technologies; and finally, socialization, psychological characteristics, games, and religion.
PN-AAC-164 $2.00

### AN EVALUATION OF USAID TECHNICAL ASSISTANCE TO THE EAFFRO LAKE VICTORIA FISHERIES PROJECT

Sutinen, J. G.; Davies, W. D.
1975, 26p.

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

## AGRICULTURE

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

(In Marine memo. no. 37)

An evaluation of existing U.S.A.I.D. technical assistance to the Lake Victoria Fisheries Project of the East African Freshwater Fisheries Organization (EAFFRO). EAFFRO has determined the existence of offshore demersal stocks (mainly *Haplochromis)* that could be exploited; annual yield has been estimated at 200,000 tons, or about twice the present harvest of inshore waters. The present concern is that offshore mechanized fishing may have detrimental effects upon the heavily exploited inshore stocks. EAFFRO's research activities appear too ambitious for the available staff, and it is felt that EAFFRO will not be able to provide management guidelines in time to avoid competition between the traditional inshore and proposed trawl fishery. The assessment of the proposal trawl fishery has not been emphasized sufficiently in the work plans of the U.S.A.I.D. biologist. There have been insufficient communication and cooperation between EAFFRO personnel at all levels and fisheries department personnel, and the information being produced appears not to be in a form and of a type that can be used readily by the people directly involved in the development and management of the fishery.
PN-AAC-165 $2.15

### A DEVELOPMENT PROPOSAL FOR LAGOONS

Lampe, H. C.
1972, 2p.

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

(In Maritimes v. 16, no. 2, p. 13-14)

The pressure to develop lagoons for fish and shellfish production has increased dramatically in the past five years. The number of schemes for lagoon development and management also has grown, ranging from elaborate water control systems, including dams and diversion canals for fresh water with sea gates to hold back the ocean, to simple gates to prevent fish from escaping once they have entered. Lagoons undoubtedly will be exploited and managed even more intensively. Thus, a strong research base is necessary to avoid ecologically and socially destructive practices at worst and to promote national development schemes that fit broad biological, economic, and social contexts.
PN-AAB-919 $2.00

## FORESTRY

### BLEACHED KRAFT PULPS FROM MIXTURES OF PHILIPPINE HARDWOODS

Laundrie, J. F.
1976, 15p.

U.S. Department of Agriculture
Forest Service
Washington, D.C. 20250

(In AID Report No. 6)

In experiments conducted at the Forest Products Laboratory, Forest Service, U.S. Department of Agriculture, Madison, Wisconsin, bleached kraft pulps, with quality equal to or better than bleached kraft market pulps made from three mixtures of 50 different Philippine hardwoods. The detailed procedures are described. The two conclusions from the study: 1) Bleachable grades of kraft pulp can be made from the three mixtures of Philippine hardwoods, which can be semibleached with a CEH sequence or fully bleached with a CEDED sequence; 2) The strength properties of the bleached kraft pulps made from all three mixtures were equal to or better than those of bleached kraft market pulps made from North American hardwoods. Tables present the names and specific gravities of the 50 Philippine hardwoods, the composition of three chip mixtures of the 50 hardwoods, the bleaching procedures used in the experiments, and the handsheet properties of unbleached and 500-gram CEDED bleached kraft pulps made from the three mixtures.
PN-AAC-620 $2.00

## HORTICULTURE

### AN EVALUATION OF FRUIT TREE ROOTSTOCKS AND ORCHARDS, AND SUGGESTIONS ON FUTURE FRUIT PRODUCTION IN URUGUAY

Carlson, R. F.
1975, 15p.

Consortium in Uruguay: Pennsylvania State, Michigan State and Texas A&M. (Agr'l Extension Service, Michigan State University, East Lansing, Michigan 44824)

(In Report No. 19)

An assessment of current testing and use of clonal rootstocks at the Las Brujas Experiment Station in Uruguay. The author's activities included advising on present and future propagation methods involving rootstocks in nursery tree production, and suggesting procedures that would improve the quality of nursery products. Some of the major points in the report: Dwarfed fruit trees have become increasingly important throughout the world, because more trees can be managed more economically per acre. Dwarf apple trees can start to produce commercial crops four to eight years earlier than standard apple trees. Dwarfed trees are made by budding or grafting any desired variety on dwarfing rootstocks. Fruit tree rootstocks to control tree size in high-density plantings are not used in Uruguay, but Las Brujas has initiated testing of some apple rootstocks. However, no research has been started to test dwarfed trees under various experimental conditions. Thus an experiment was designed for trees to be planted in the spring of 1976. Short-term research tests related to fruit production from compact trees were initiated. Tests of methods of rootstock propagation were also initiated. At various meetings with nurserymen and farm owners, the author stressed the importance of getting new-orchard production off to the best possible start by planting high-quality trees and providing high-quality orchard management.
PN-AAB-944 $2.00

## INSECTS AND PESTS

### ROOT-KNOT NEMATODES, MELOIDOGYNE SPP.: PROCEEDINGS OF A CONFERENCE

North Carolina State, Department of Plant Pathology
1976, 110p.

Department of Plant Pathology
North Carolina State University
Raleigh, North Carolina 27607

At this conference, the six overseas laboratories (Southeast Asia, South America, Central America, and Mexico, West Africa, East Africa, and Brazil) were represented by a regional investigator who reported on his particular area. Several consultants and scientists from the U.S. reviewed the basic aspects of the genus, such as taxonomy, morphology, host studies, ecology, diseases, and breeding. These reports and technical discussions are reproduced here. These cooperative research efforts should provide a better understanding of the biological behavior

of one of the world's major crop pests. Such behavior is influenced not only by the genetic and and biochemical make-up of the organism, but by pressures imposed by various environmental influences. The more known about the nematode and these environmental influences on disease development, the more likely conditions can be provided favorable to the host plant and less or unfavorable to the nematode.
PN-AAC-129 $9.15

### INFORMATION SYSTEMS FOR ALTERNATIVE METHODS OF PEST CONTROL, WITH EMPHASIS ON PROBLEMS AND NEEDS OF CROP PROTECTION SPECIALISTS IN DEVELOPING COUNTRIES

Bottrell, D. G.; Huffaker, C. B.; Smith, R. F.
1976, 45p.

Department of Entomological Sciences
University of California
Berkeley, California 94720

(Presented at FAO/UNEP Consultation on Pest Management Systems for the Control of Cotton Pests, Karachi, Pakistan, 1975)

This document addresses the problems and progress of information systems as related mainly to non-chemical methods of pest control, and discusses some of the major problems and needs confronting pest control specialists in developing countries. It was found that information about various methods of pest control must be coordinated and consolidated in order to aid pest management programs in developing countries; computer-based data bases and their services offer tremendous potential for this. Scientific societies, information centers, and organizations assisting these developing countries must provide immediate solutions to the most pressing needs in information gathering and dissemination. To begin solving these needs, it is recommended that an international information project center for alternative methods of pest control be formed. It is mandatory that the institution selected to coordinate the project has a wide range of inter-disciplinary programs in pest management, and a staff of highly knowledgeable pest management scientists in these disciplines to utilize the various pest control methods in the developing countries.
PN-AAC-145 $3.75

## IRRIGATION

### SEDIMENT STABLE CANAL SYSTEMS

Temple, D. M.
1976, 150p.

Engineering Research Center, Foothills Campus
Colorado State University
Fort Collins, Colorado 80521

(Masters thesis—Colorado State)

A discussion of the considerations required for the design of sediment transporting channels as components of a branching canal system. Attention is given to the selection of compatible approaches for the determination of channel geometry and bed material transport capacity to be used in conjunction with sediment routing relations. A generalized procedure is presented which includes sediment equilibrium considerations as a part of the system design criteria. The development of methods currently in use for the design of individual channels in erodible material is reviewed as are various computational techniques for the estimation of bed material transport capacity. In general, no specific approach or computational technique may be considered best for all applications due to the large number of variables involved, the complexity of their inter-relation, and the variability of field conditions. Emphasis therefore is placed on the concepts, assumptions, and data on which a specific method is based, rather than on the mechanics of its application.
PN-AAC-178 $12.45

### WATER MANIGEMENT ALTERNATIVES FOR PAKISTAN: A TENTATIVE APPRAISAL

Eckert, J. B.; Dimick, Niel; Clyma, Wayne
1975, 70p.

Water Management Research Project
Engineering Research Center
Colorado State University
Fort Collins, Colorado 80521

In Water Management Technical Report No. 43

The irrigation system of the Indus basin in Pakistan is the largest in the world, with 38,000 miles of canals and 100,000 private tubewells delivering water to 78,000 watercourses serving more than three million farms on 31 million acres. The system is not very efficient. For every 100 million acre feet (MAD) of water diverted, only about 30 MAF are effectively stored in root zones on client farms for crop use. Most of these losses occur in the poorly constructed, poorly maintained earthen channels of the watercourses. Thus it is imperative that a water management program be launched to raise the efficiency for the entire system. The three objectives of the program would be to (1) improve the watercourses, so as to deliver much more irrigation water; (2) conduct extensive land-leveling, so as to more effectively distribute the received water; and (3) improve irrigation practices on the farms, so as to permit extension of the irrigated areas. The report presents cost-benefit evaluations of several different water management program alternatives for the Indus basin. Among the many recommendations in the report, the authors emphasize that routine watercourse maintenance should be initiated and institutionalized at the village level as soon as possible through development of local Water User Associations.
PN-AAB-673 $5.80

### VILLAGE ORGANIZATIONAL FACTORS AFFECTING WATER MANAGEMENT DECISION-MAKING AMONG PUNJAB FARMERS

Mirza, A. H.; Freeman, D. M.; Eckert, J. B.
1975, 67p.

Engineering Research Center
Colorado State University
Fort Collins, Colorado 80521

(In Water Management Technical Report No. 35)
Copies available from address above @ $3.00.

Pakistani farmers are served by the world's largest irrigation system. About forty thousand miles of canals deliver water to approximately twenty-five million acres. The over-all pattern of water flow is from one of the major rivers to major and minor canals, through outlets *(moghas)* to watercourses to farmers' fields. In Punjab, the network of canals is under the control of the provincial department of irrigation. This department is responsible for maintaining the canals, their major and minor branches, throughout the province. Each village has one or more *moghas* whose size is determined by irrigation officials who in turn construct the *moghas*. The farmers themselves construct a watercourse from the *mogha* to their farms along proscribed routes. Within these constraints, the farmers collectively provide for watercourse cleaning, maintenance, and the application of water to their fields. This report is on research conducted in 1973 on the water management decision-making patterns of selected farmers in a sample of fifteen Punjabi villages. Three aspects of farmer decision-making were emphasized: 1) cleaning and maintenance

of watercourses, 2) changing of agreements about the water schedule, and 3) interaction with irrigation authorities. Based on these aspects, seven hypotheses were formulated which are detailed and discussed here: 1) Single or multi-caste villages will mobilize more collective effort for improving double-caste villages. 2) The larger the number of households sharing a watercourse, the worse the collective water management decision-making will be. 3) Villagers near the watercourse tail will make more effort to clean it than will those near the watercourse head. 4) Farmers near the watercourse tail will interact more with irrigation officials about water losses than those near the head. 5) The greater the difference between the smallest and the largest landowners actually working the land, the greater the pressure to change water schedule agreements. 6) The irrigation bureaucracy responds better to problems in villages dominated by large landlords than to those in villages inhabited entirely by small farmers. 7) Public tubewells on a watercourse increase the need for cleaning and maintenance but reduce the effort given to those tasks.
PN-AAB-719 $5.55

### IRRIGATION PRACTICES AND APPLICATION EFFICIENCIES IN PAKISTAN

Clyma, Wayne; Ali, Arshad; Ashraf, M. M.
1975, 41p.

Engineering Research Center
Colorado State University
Fort Collins, Colorado 80521

(In Water Management Technical Report No. 39)
Copies available from address above @ $3.

A report on farmer irrigation practices studied for one year in the Mona Project of Pakistan. Most of the data presented in this study were collected in SCARP areas where canal supply is augmented by tube ? water ? provide about one ? per 150 acres. First is a description of observed farm water management practices, a sort of hypothesis of farmer irrigation practices, which then are documented with the data collected. The method used was to evaluate qualitatively practices and circumstances that cause ineffective use of irrigation water. Effectiveness of irrigation water use then was evaluated quantitatively in terms of irrigation application efficiency. Factors contributing to the ineffective use of water in Pakistan are: 1) Lack of water measurement and the assumption by researchers and farmers that a certain depth of water on the field means a given amount of water has been applied. 2) Inadequately leveled and improperly designed fields. 3) Infiltration rates that cause excessive applications when water use rates are low and under-irrigation when water use rates are high. 4) The inability to adjust frequency of irrigation to crop water requirements due to the fixed water-use schedule. Irrigation application efficiencies measured was near 20 percent based on 64 individual observations. Improvement of on-farm water management has a great potential for increasing the effective irrigation water supply.
PN-AAB-720 $3.40

### IMPROVING FARM WATER MANAGEMENT IN PAKISTAN

Corey, G. L.; Clyma, Wayne
1975, 37p.

Engineering Research Center
Colorado State University
Fort Collins, Colorado 80521

(In Water Management Technical Report No. 37)
Copies available from above address @ 3.00

Pakistan's water irrigation system is one of the world's largest modern conveyance systems and is a marvel of engineering skill and technology. There is, however, little information available about and thus little understanding of that portion of the irrigation system under the farmer's control. This is the portion from the canal outlet *(mogha)* through the irrigated field, which is managed by the farmer with little or no governmental assistance. A description of this farmer-operated system, the reasons for its present condition, an evaluation of its problems, and suggestions for its improvement are offered in this report with the hope that through better water management, production will be increased. Toward this end, five recommendations are made and discussed: 1) Research programs dealing with on-farm water management should be given high priority. 2) Conjunctive uses of ground and surface waters should be encouraged. 3) A national program of precision land-leveling should be launched. 4) Watercourses should be rehabilitated for more effective field delivery, and 5) Rules and procedures for water delivery to the farmer should be reviewed.
PN-AAB-721 $3.10

## LEGUME CROPS

### UPTAKE OF THREE SYSTEMIC FUNGICIDES BY GERMINATING SOYBEAN SEED

Thapliyal, P. N.; Sinclair, J. B.
1970, 3p.

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

(In Phytopathology, v. 60, No. 9, pp. 1373-1375)

Soybean seeds were either treated or nontreated with benomyl, chloroneb, and DMOC at 0.125, 0.25, or 0.5g/100g (2, 4, or 8oz/100b.). For the first experiment, approximately 40 seeds of Wayne cultivar, nontreated or treated with one of the three fungicides at one of the three rates, were exposed for either 12, 24, 36, 48, or 96 hrs in the germinator, then were taken aseptically from the germinator and prepared for bioassay by removing the seed coat. For the second experiment, approximately 100g of seed of Amsoy cultivar were treated with benomyl at one of the three rates and incubated for either 12, 24, 36, 48, 60, 72 or 84 hrs in the germinator. Each plate was inoculated with *Rhizoctonia solani* and incubated at room temprature, and radical growth was measured. The experiment was repeated three times and statistically analyzed. The major finding was that benomyl, or a compound related to it, becomes localized in the cotyledons. Benomyl remained active in hypocotyl tissue for a relatively short period of time, and thus offered only limited protection to soybean seedlings. These results may explain, in part, the general lack of success in increasing soybean stands by using systemic fungicides.
PN-AAB-865 $2.00

### PREDICTING SOYBEAN GROWTH AS AFFECTED BY WATER MANAGEMENT

Hill, R. W.; Ryan, K. H.; Johnson, D. R.
1976, 29p.

Utah State University, Department of Agricultural and Irrigation Engineering
Logan, Utah 84321

This computer model predicts crop growth and yield as a function of soil and weather factors. When the program is used for scheduling irrigation, the required depth and timing of irrigation water for any planting date is determined by simulating the effects of incremental supplements of water. The "best" resultant irrigation scheduling is indicated for any given pre-selected yield level. The computer program is useful for estimating probabilities of management effects on soybean yield from historical

weather data at any selected site. The program does not eliminate the need for field trials, but it can be used to identify the more promising varieties, planting dates, and water management practices. Thus, field work can be concentrated on problem areas, with a result savings of time and money.
PN-AAC-319 $2.40

### GRAIN LEGUME PRODUCTION (LATIN AMERICA) ANNUAL PROGRESS REPORT: JULY-DECEMBER, 1973 (terminal)

(101) U.S. Department of Agriculture, Agricultural Research Service (Latin America)
1974, 30p.

U.S. Department of Agriculture, Agricultural Research Service
International Programs Division
Hyattsville, Maryland 20782

(Research Summary)

This terminal report of a ten-year contract period covers the period July through December, 1973. Principal activities entailed acquainting personnel of the University of Puerto Rico with the projects in progress and arranging for the administrative takeover by the University, under whose auspices the grain legume research will continue. Time was also spent in analyzing data from the various projects and preparing publications, as well as classifying and cataloging the seed collection. Studies were continued with bacterial blight of beans and cowpeas, and the role played by insects in the spread of these bacterial pathogens. Numerous collections were made of insects in bacterial blight-infected bean and cowpea plantings. Only a few insects commonly considered pests of the foliar portions of these two food legumes were found to be vectors of bactrial blight under natural field conditions in Puerto Rico. The most important insect vectors were *Diaprepes abbreviatus* and *Cerotoma ruficornis*. This report presents 25 summary statements of findings from a survey of diseases and pests of beans and cowpeas in Central America and the Caribbean. Also included are 17 statements of findings from research studies of fungal and bacterial diseases of these legumes. A tabular summary of the origins and numbers of cultivars assembled in the seed acquisition program and stored in the germplasm bank at FES, Mayaquez, Puerto Rico, is also presented. The final section of the report discusses short-term and long-term problems and complications associated with research on bean and cowpea pathogens in Central America, the Caribbean, Iran and India.
PN-AAC-323 $2.50

### MODE OF ACTION OF THE TOXIN FROM PSEUDOMONAS PHASEOLICOLA, I: TOXIN SPECIFICITY, CHLOROSIS, AND ORNITHINE ACCUMULATION

Patil, S. S.; Tam, L. Q.; Sakai, W. S.
1971, 5p.

University of Hawaii, Department of Agronomy
and Soil Science
College of Tropical Agriculture
Honolulu, Hawaii 98622

(In Plant Physiology, v. 49, p. 803-807)

The specificity of the *Pseudomonas phaseolicola* toxin for enzyme inhibition and its relationship to toxin-induced chlorosis in bean leaves *(Phaseolus vulgaris* L.) was examined. The toxin showed no significant inhibitory activity against glutamine synthetase, glutamine transferase, carbamyl phosphate synthetase, aspartate carbamoyl-transferase, or arginase at concentrations 100-fold higher than that needed to inhibit ornithine carbamoyltransferase by 50%. Protection from and reversal of toxin-induced chlorosis in bean leaves was attempted with several amino acids. Aside from protection with L-citrulline which was previously reported, only L-arginine-HCl and to a minor extent L-leucine and L-glutamine showed protection from chlorosis, L-Citrulline and L-arginine-HCl (but not L-glutamine and L-leucine) also reversed toxin-induced chlorosis. Ultrastructurally, cells from toxin-treated chlorotic tissues showed no observable changes as compared to nontreated tissues. This together with the ability of the two amino acids to reverse chlorosis, indicated that the toxin causes a reversible biochemical lesion in treated tissue. While tissues from bean plants inoculated with *P. phaseolicola* showed a large accumulation of ornithine, toxin-treated tissues showed no accumulation of ornithine. The latter finding indicated that in addition to the ornithine carbamoyltransferase inhibitor, the pathogen may produce inhibitors of other ornithine metabolizing enzymes in inoculated tissues.
PN-AAC-361 $2.00

## PASTURE CROPS

### FUNGICIDE EFFECTS ON FUNGAL ECOLOGY IN CREEPING BENTGRASS TURF

Meyer, W. A.; Britton, M. P.; Gray, L. E.; Sinclair, J. B.
1970, 7p.

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

(In Mycopathologia et mycologia applicata, v. 41, pp. 167-176)

This paper reports the results of a qualitative comparison of various genera of fungi isolated from creeping bentgrass turf plots treated with six fungicides for four and five years in comparison with a non-sprayed control plot. The fungicides used were Fore, Actidone-Thiram, Dyrene, PMA plus Thiram, Kromad plus Calaclor, and Tersan OM. There were no great differences found in the distribution of various fungal genera isolated from the nonsprayed and sprayed bentgrass turf. The high organic matter content in the soil and thatch layer associated with turf grass may be responsible for rapid chemical and/or microbial degradation of these fungicides, and may account for the lack of any qualitative effects on the fungal ecology.
PN-AAB-862 $2.00

### PYRENOCHAETA TERRESTRIS, A ROOT PATHOGEN ON CREEPING BENTGRASS

Meyer, W. A.; Sinclair, J. B.
1970, 2p.

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

(In Plant Disease Reporter, v. 54, No. 6, pp. 506-507

A report of the results of pathogenicity tests of isolates of *P. terrestris* from creeping bentgrass on that host. Creeping bentgrass ('Toronto') plants were propagated by planting single-node stolons into flats of autoclaved, sandy-loam soil. The plants were grown in the greenhouse at 25°C for six weeks and maintained at a cutting height of 5 cm. The plants were inoculated by a root-dip technique, then, in a second experiment, by means of a soil-infusion needle. Results of the tests showed that *P. terrestris* is a root pathogen on creeping bentgrass. To the authors' knowledge, this is the first report of this organism as a pathogen on *A. palustris*. The presence of *P. terrestris* may have been missed previously in isolation plates, because it is a slow-growing fungus. The use of a surfactant to retard the growth of fast-growing fungi in culture probably contributed to the recogni-

tion of this fungus in isolation plates. Since this fungus was isolated often from the thatch and soil layers associated with bentgrass, and, given the results presented here, it is evident that *P. terrestris* should be considered a root pathogen of creeping bentgrass.
PN-AAB-863 $2.00

## POULTRY

### NUTRITIONAL VALUE OF HIGH LYSINE SORGHUM GRAIN FOR THE CHICK

Featherston, W. R.; Rogler, J. C.; Axtell, J. D.; Oswalt, D. L.
1974, 5p.

Agronomy Department
Purdue University
Lafayette, Indiana 47967

(In Poultry Science, v. 4, no. 4, p. 1221-1225)

Growth studies were conducted with day-old chicks to compare the nutritional quality of a high lysine sorghum grain (IS11758) with two low-tannin commercial sorghum grains (RS671) and RS610) in diets containing various protein levels. When the sorghum grains were compared on either an equal weight or equal protein level in diets in which all protein was supplied by the sorghum grains, the high lysine sorghum produced weight gains of approximately three times those noted with the commercial ("normal") sorghum and with approximately 50% less feed required per unit grain. Supplementation of the normal sorghum diet with lysine to equal the level supplied by the high lysine sorghum resulted in similar chick growth and feed efficiency. These results indicate that the improved performance of chicks fed high lysine sorghum was due solely to its higher lysine content. Chicks fed the high lysine sorghum diets supplemented with safflower meal or soybean meal to a 15% protein level grew 2.5 and 1.9 times faster, respectively, and were significantly more efficient in feed utilization than their corresponding counterparts fed normal sorghum diets. These results indicate that the nutritional quality of high lysine sorghum grain is markedly superior to that of two commerical sorghum grains.
PN-AAB-923 $2.00

### TEACHING GUIDE IN POULTRY MANAGEMENT

Hess, Oleen; Pacariem, R. C.; Kugler, H. L.
1959, 194p.

Agency for International Development
USAID Mission in the Philippines

This guidebook is designed to assist teachers in Philippine agricultural schools in preparing lesson materials for training students in better methods of poultry production. Its introductory section discusses such topics as site selection, selecting and obtaining chicks, obtaining chicks suited to one's intended purposes, crosses between types, and setup procedures. The next section, on incubation, discusses selection of eggs for hatching, artificial incubation, turning eggs, testing eggs, putting out the hatch, and natural incubation. Next, the section on brooding discusses selection and management, types of brooders, management of the brooder, types of floor brooding, natural brooding, feeders, waterers, feeding recommendations, and general management of chicks. A section on raising pullets discusses the barrio, range rearing, preparing laying house for pullets, and culling pullets. An extensive section on the management of a laying flock includes discussions of housing, construction of buildings, roofing, laying house equipment, feeding, determining ration ingredients, proteins, minerals, vitamins, antibiotics, ration mixtures, producing and marketing quality eggs, producing hatching eggs, upgrading, manure handling, and culling. A final section on poultry diseases and their prevention discusses a health program, immunization, parasites, and nutritional disease.
PN-AAB-963 $16.10

## VEGETABLES

### AVRDC, ANNUAL REPORT, 1972-1973

AVRDC
1974, 55p.

Asian Vegetable Research and Development Center (AVRDC)
P.O. Box 42, Shanhua, Tainan, Taiwan

(Research summary)

This is the first published annual report of the Asian Vegetable Research and Development Center (AVRDC). The purpose of AVRDC's research program is to bring higher yield potentials to important food crops that contain more protein, vitamins, and minerals than do the staple cereal grains. Furthermore, those crops chosen because of their adaptability to upland soils and their demand in the market, promise higher incomes and improved nutrition for the Asian small farmer who often depends almost entirely on rice for his income and food. As rice still will be the staple food for monsoon Asia, the crops that AVRDC is working on will be improved primarily as produce to be grown in conjunction with that grain. From the more than 100 different crops classified as vegetables, AVRDC selected six for early major attention. They are the mungbean, the soybean, the tomato, the sweet potato, the Irish potato, and the Chinese cabbage. This report examines the accomplishments of the AVRDC scientists, since the beginning of the Center, in growing these six vegetables.
PN-AAB-817 $4.55

## WATER MANAGEMENT

### THE INDUS RIVERS AND TARBELA DAM

Thomas, J. W.
1972, 65p.

Center for International Affairs
Harvard University
Cambridge, Massachusetts

A fairly brief history of the Indus River Basin, with special emphasis on the history of the Tarbela Dam. The report begins with a quick description of the Indus River Basin and then discusses the independence of India and the creation of Pakistan. With partition came conflict over the river and in particular, over the various river projects. The author examines the political history of Pakistan and India during this turbulent period (1950 - 1960) up to the Indus Basin Agreement at the end of this period. Then the creation of the West Pakistan Water and Power Development Authority (WAPDA) is detailed and debated quite thoroughly. Other development agencies and commissions are studied, as well as U.S.-Pakistan relations during this time. Finally, the impact of the Tarbela Dam on domestic politics and economic development is discussed. The author brings us up to date in his conclusion by indicating that controversy continued to plague the dam project, the lowest bid from a pre-qualified bidder was not accepted, but that eventually the contract went to a consortium of firms led by an Italian company. Tarbela Dam was scheduled for completion in 1975.
PN-AAC-100 $5.40

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

### GROUNDWATER MANAGEMENT AND SALINITY CONTROL

Cummings, R. G.; McFarland, J. W.
1974, 7p.

University of Rhode Island
Department of Resource Economics
Kingston, Rhode Island 02881

(In Water Resources Research, v. 10, no. 5, p. 909-915)

An analytical framework required for an integrated approach to the water-salinity management problem. In the section on the groundwater management model, such a framework is presented. In the section on decision rules, policy implications of this approach are examined, particularly as they relate to the difficulties associated with the use of economic incentives to bring about optimal water use patterns in a decentralized decision-making environment. It was found that relatively few adjustments are required in the groundwater management model for its applicability to a wider range of water management models, e.g., the conjunctive use of groundwater and surface water, interbasin management systems, and the like.
PN-AAC-392 $2.00

### INVESTIGATING AGRICULTURAL WATERLOGGING AND SALINITY PROBLEMS

Svendsen, M. T.
1976, 175p.

Colorado State University
Engineering Research Center
Fort Collins, Colorado 80521

(Thesis M.S.—Colorado State)

Waterlogging and excess salinity in irrigated soils is a major impediment to increased productivity of agricultural systems in many developing countries. Removing this impediment requires a methodology for the systematic study of the nature, seriousness, and sources of the problem. This thesis attempts to develop such a methodology by drawing on existing knowledge and incorporating it into a logical investigative framework. First presented is background information in the form of a model of how agricultural water is used, followed by a description of the problems caused by waterlogging and excess salinity. An agricultural system is defined and described in terms of water delivery, water use, and removal and drainage subsystems. The general concept of water and salt budgeting is used to define data needs and to identify linkages among system components. Appropriate techniques for measuring the quantity and quality of relevant surface and ground water flows are then presented, with special attention paid to the farm water-use subsystem that is the heart of the irrigated agricultural enterprise. Finally, water and salt budgets for each subsystem and for the system as a whole are developed and presented.
PN-AAC-591 $14.50

### INTERNATIONAL CONFERENCE ON GLOBAL WATER LAW SYSTEMS; SUMMARY REPORT

Radosevich, G. E.; Boira, V. G.; Daines, D. R.; Skogerboe, G. V.; Vlachos, E. C.
International Conference on Global Water Law Systems, Valencia, Spain, 1976
1976, 52p.

Colorado State University
Center for Economic Education and Department of Economics
Fort Collins, Colorado 80521
PN-AAC-592 $4.30

# ECONOMICS

## GENERAL ECONOMICS

### PRODUCTION CHARACTERISTICS IN FOREIGN ENCLAVE AND DOMESTIC MANUFACTURING: THE CASE OF INDIA

Leipziger, D. M.
1976, 22p.

Bureau for Program and Policy Coordination
Agency for International Development
Washington, D. C. 20523

(In AID discussion paper no. 33) Copies available at no cost from Naomi Copeland, Agency for International Development, PPC/EMS, Room 3665 NS, Washington, DC 20523

An estimation of Cobb-Douglas production functions for U.S.-owned and Indian-owned manufacturing affiliates. It was discovered that U.S. firms in the sample of manufacturing affiliates employ a less capital-intensive technology but a higher fixed capital intensity than Indian firms. Abstracting from possible differences in the age of capital between samples, the inference is that the technology imported by or developed for Indian firms would be more capital-using to produce the same bundle of output produced by the U.S.-owners. Also, it was found that U.S. firms in India face a higher wage-interest ratio than domestic firms and thus adjust the ex ante technology, so that on the average they utilize more fixed capital per man ex post than counterpart Indian firms.
PN-AAC-193 $2.00

### SHADOW PRICING, INTERNATIONAL TRADE AND THE THEORY OF THE SECOND-BEST

Warr, Peter
1976, 34p.

Center for Economic Research, Department of Economics
University of Minnesota
Minneapolis, Minnesota 55455

(In Discussion paper no. 76-67)

An analysis of the properties of "second-best" optimal shadow prices for guiding public production in a small, open economy in the presence of fixed distortionary taxes. A simple, explicit optimization model was used, in which the tax distortions were incorporated directly as constraints. This exercise showed that, using a traded commodity as numeraire: 1) The second-best optimal shadow prices of a traded commodity is its "final consumption effect," relative to that of the numeraire commodity, defined at the optimum. 2) The second-best optimal shadow price of a non-traded commodity also is given by its "government revenue effect," relative to that of the numeraire commodity, defined at the optimum. In these models this concept is logically equivalent to that of a "final consumption effect." 3) The second best optimal shadow price of a non-traded commodity is given by its "foreign exchange effect," defined at the optimum, when all final consumption goods are traded. When only some are traded and some are non-traded, this result does not hold generally and when all final consumption goods are non-traded, the concept of a "foreign exchange effect" is meaningless.
PN-AAC-263 $2.80

### TRADE STRATEGIES FOR ECONOMIC DEVELOPMENT, THE ASIAN EXPERIENCE (PROCEEDINGS)

(101) Seminar on Trade Strategies for Economic Development: the Asian Experience Manila, 1974; Asian Development Bank
1974, 418p.

## ECONOMICS

National Bureau of Economic Research
New York, New York

Copies available from the Economic Office, Asian Development Bank, P.O. Box 789, Manila, Philippines

These proceedings present the contents of a seminar convened in December, 1974, to discuss the results of a research project entitled "Trade Strategies for Economic Development: The Asian Experience," sponsored by the NBER with funding by USAID. Ten country studies undertaken during the project involved Brazil, Chile, Colombia, Egypt, Ghana, India, Israel, Korea, Philippines, and Turkey. The principal results of the individual country studies are discussed in the overall syntheses authored by the Seminar co-directors. Those are entitled "Anatomy and Consequences of Exchange Control Regimes," introduced by J. N. Bhagwati for discussion, and "Liberalization Attempts and Consequences," introduced by A. O. Krueger. The country studies synopsised and discussed include those on the Philippines, Republic of Korea, India, and Egypt. General background papers read and discussed in the seminar were entitled "Projections and Analysis of Trade Development in Selected Developing Countries in the Asian Region, 1974 and 1975," by P. P. Chang, and "Development in Trade and Trade Policies in the Developing ESCAP Countries," by S. Nishimoto.
PN-AAC-550 $34.70

### DYNAMIC MODELS FOR SIMULATING THE VENEZUELAN ECONOMY

(101) Simulmatics Corporation
Central University of Venezuela
Center for Development Studies
1966, 274p.

Simulmatics Corporation
Cambridge/New York/Washington

The work reported here was conducted in Caracas from 1963 through 1966 by the Simulmatics Corporation, working in collaboration with the Universidad Central de Venezuela and CORDIPLAN, the Venezuelan government planning agency. A series of models of the Venezuelan economy was formulated for use in studying the nation's development strategy by means of computer simulation. With this technique, alternatives can be compared in a way that offers guidance to policymakers without impeding their use of judgment and intuition in making planning decisions. The principles of simulation are briefly presented and then illustrated by a detailed plan for a policy study. The analysis and experiments to be conducted are explained. The study plan is not just a hypothetical illustration; it is based on the actual situation in Venezuela and the capabilities of the model (V-2A) developed for use in such studies. The authors recommend that CORDIPLAN carry out this plan. Further sections of the report review the development of various simulation models considered, and explain their differences; summarize problems encountered and the work done in analyzing statistics; describe uses to which the Model V-2 was put in helping CORDIPLAN in its economic planning activities; present details of the abstract model; and present recommendations for future activities in Venezuela.
PN-AAC-551 $22.75

### MEASURING THE EFFECTS OF PROTECTION ON RESOURCES ALLOCATION

De Melo, Jaime
1976, 38p.

Agency for International Development
Bureau of Program and Policy Coordination
Washington, D.C. 20523

(In AID Discussion Paper No. 35)

This paper, which is based on a doctoral thesis in economic modeling, presents estimates of the effects of protection on resource allocation in a general equilibrium resource allocation model. A section of the paper briefly describes a Walrasian general equilibrium trade model applied to Colombia to study the effects of price distortions on sectoral resource allocation. Next discussed are estimates of the effects of protection in Colombia, as obtained from the model. Finally, those results are compared with those that might be obtained by use of a partial equilibrium analysis. The author concludes that even within a simple general equilibrium model, the interaction of many effects ultimately determines the impact of price distortions on resource allocation. Some of the effects are likely to be more important than others. Among those that are likely to escape intuition is the finding that factor price variations and also adjustments in the relative price of non-traded goods in response to tariff changes are likely to affect sectoral output responses to changes in tariff structures. The model developed in this paper may be best viewed as a useful tool for exploring the relative importance of various interdependencies which should be taken into account when formulating a protective policy. The model indicates that Colombia has the greatest comparative advantage in primary products: agricultural products and mining. Next, within the manufacturing sector, it has a comparative advantage in food, beverages, tobacco, and nonmetallic products. These sectors are relatively intensive in their use of unskilled labor. Thus a move towards freer trade, by providing greater uniformity of incentives between agricultural and manufacturing sectors, would increase employment of unskilled labor.
PN-AAC-625 $3.15

## AGRICULTURAL ECONOMICS

### THE DISTRIBUTION IMPACT OF AGRICULTURAL GROWTH, LOW INCOME FARMERS, AND THE "SYSTEM"; A CASE STUDY OF SAHIWAL DISTRICT, WEST PAKISTAN

Gotsch, C. H.
1971, 70p.

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

A theoretical construct of a system within which low-income farmers function, followed by a case study of how the system illustrates the problems of low-income farmers in Sahiwal District, West Pakistan. The system described is a framework for conceptualizing the low-income farmer problem. First discussed is the distinction between the absolute and relative meanings of "low income." Next, a system for examining the low-income farmer problem is discussed in terms of three key questions: the boundary of the system, its key variables, and endogenous variables. Next discussed are the casual relationships in the system, including the motivations of the farmer. The study of Sahiwal District uses as its base point the conditions in the District as of 1960. Prior to this date the agricultural sector had been virtually stagnant. First discussed are average cost curves for different types of technology; next, size distribution of holdings by tenure status, followed by the distribution of institutional services, and the distribution of income/power. Next discussed is the performance of the system in Sahiwal District, 1960-1970, in terms of agricultural growth, changes in income distribution, and the position of low-income farmers in the system. The author concludes that the decade of rapid growth has made virtually all small farmers worse off relatively and a good many of them worse off absolutely. The larger farmers control existing institutions through a combination of corrupt practices and political power. Government tax and price-support policies support this trend.

Land redistribution is the surest and quickest solution to this problem.
PN-AAB-902 $5.80

### IMPROVING OPPORTUNITIES FOR LOW-INCOME FARM OCCUPIED PEOPLE, SOME INDIAN EXPERIENCES

Malone, C. C.
1971, 37p.

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

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

The author delineates 15 agro-economic areas of India which include about 98 per cent of all Indian agricultural production. He discusses rainfall patterns, predominant crops, population densities, and crop values, number of farms in the agro-economic areas by size ranges, number of landless worker families, and other statistical measures. Next discussed is the Intensive Agricultural Development Program organized by the Indian government in 1960. Several considerations of the program designers are described: the replacement of limited Department of Agriculture practices by a carefully designed, integrated field program; development of a package of services to integrate production credit and technical inputs; widespread involvement of the villages and village farmers; and creation of incentives to encourage farmers to speed up production increases on their farms. Progress under the IADP approach was generally slow during the first five years, especially in rice yields, until 1966-67, when new, high-yielding varieties were introduced. Comparative statistics on increases in yields by farm size are presented and discussed. Among the author's conclusions: The most important contribution of the IADP is that it has been an effective means of encouraging farmers to raise their productivity. It has also helped develop professional staff at all levels. However, it is still more difficult to get small farmers to gamble on new varieties developed at the research stations. What is needed is an extensive adaptive trial-research program to run parallel with the work at the research stations.
PN-AAB-903 $3.10

### ESTIMATES OF FOODGRAIN PRODUCTION AND MARKETINGS FROM INPUT ESTIMATES, INDIA, 1949/50 INDIA, 1949/50 to 1973/1974 AND PROJECTIONS TO 1983/1984

Mellor, J. W.; Lele, U. J.; Biamonte, Debra; Goldsmith, Arthur
1975, 34p.

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

(In Occasional Paper no. 83)

Food grain production for specific years and hence trends over short periods of time are influenced strongly by random variations in weather, thus making difficult to detect trends in production and the various causal factors in those trends. Indian food grain production analysis has been made from four key inputs — irrigated land, unirrigated land, labor, and inorganic fertilizer. The input analysis has been chosen for its advantage in utilizing readily available and easily substantiated data. Further, this approach provides a quantitative measure of the structural change in sources of production and the basis for estimating change in marketing. This paper is divided into three sections. The first analyzes the food grain production and marketing record from 1949/50 to 1973/74. The second offers projections, based on past trends, of potential production and marketing from 1970/71 to 1983/84. The third contrasts these trends with official production data and summarizes the implications for future policy.
PN-AAB-930 $2.80

### FACTORS AFFECTING THE ECONOMIC AND SOCIAL WELL-BEING OF AGRICULTURALISTS IN LESS DEVELOPED COUNTRIES

Hexem, R. W.
1971, 421p.

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

(In Development Series Report no. 7)

The "self-help" provisions of the Food for Peace Act of 1966 emphasized the complementary roles that recipient governments must play in stimulating domestic agricultural production. Under the provisions of the Act, recipient governments were obligated to initiate institutional reforms, encourage development of agricultural input-supplying industries, and generally maintain a favorable climate. These provisions are to encourage expansion of private investment and production activities in the agricultural sector, but they generally have required additional public measures which use financial and administrative inputs. The purpose of national planning, of which the self-help provisions are a part, is to help ensure that these scarce inputs are utilized efficiently. This study analyzes these various scarce inputs and their interrelationship. It concludes that ideally a coordinated program of alleviating obstacles simultaneously is needed, though few countries have the necessary financial and administrative resources. Therefore, each potential allocation of these resources should be subjected to at least an economic test of its merits over other allocations. With this in mind, planners should try to develop those programs consistent with existing realities. General prescriptions and borrowing developmental plans from other areas are of little use, if not detrimental.
PN-AAC-036 $34.95

### A FIVE SECTOR MODEL OF AGRICULTURAL DEVELOPMENT, INDUSTRIALIZATION, AND FOOD AID IN A DUAL ECONOMY

Haessel, W. W.; Heady, E. O.; Mayer, L. V.
1972, 131p.

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

(In CARD Report 43T)

An investigation of the inter-relationships between the agricultural and non-agricultural sectors during economic development, with emphasis on the effects of food aid. Most of the study is devoted to a theoretical analysis of these intersectoral relationships. A five-sector, optimizing model of an underdeveloped, dual economy is formulated and analyzed extensively. The five sectors include subsistence or traditional agriculture, commercial agriculture, manufacturing goods production, capital goods production, and a government sector. Three products are produced: agricultural goods, which only can be consumed, manufactured goods which either can be consumed or used as nondurable factors of production, and capital goods which only can be used as durable factors of production. A summary of the study's conclusions is as follows: 1) In an economy with a given resource base, capital stock, level of technology, and wage-price configuration, the proportion of the labor force engaged in subsistence employment will increase as the size of the labor force increases. 2) If the productivity in a particular sector increases

more rapidly than in other sectors, the social desirability of investing in this sector will increase if there are no adverse effects on terms of trade. 3) The effects of an increased population depend on the magnitude of the population growth rate relative to (a) the size and growth rate of the capital stock and (b) the rate of technological improvement. 4) If recipients of aid grants divert some of their income previously spent on food to non-food commodities, a drop in food price will result. With food aid sold in the market place and the revenue used to hire subsistence labor, the economy is affected in the same way as when food is distributed as wages.
PN-AAC-037 $10.90

**SELECTED DATA ON POPULATION, FOOD SUPPLY AND FOREIGN AID**
Ames, G. C. W.
1969, 35p.

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

This report consists of 30 pages of tables and graphs and five pages of selected references at the back. There is no text, save for a brief forward and preface. The general subject of the data is world food problems, of which there are three main parts: 1) population and food supply; 2) U.S. agricultural exports; and 3) foreign aid. The compiler was a graduate student in Agricultural Economics when these data were collected.
PN-AAB-955 $2.90

**HOW COMMERCIAL BANKS FINANCE SMALL FARMERS THROUGH AGRICULTURAL CREDIT COOPERATIVES IN INDIA**
Ames, G. C. W.
1976, 8p.

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

(In Agricultural Finance Review, v. 36, pp. 24-31)

A review of how well nationalized commercial banks in India meet the needs of small farmers in Karnataka State by providing financing through cooperatives, and what adjustments are needed. Commercial banks have had mixed success in providing financing through cooperatives for farmers with small landholdings. In Karantaka State, commercial banks financed about 39 percent of the members of their cooperatives. Several reasons account for the failure of lending institutions to provide loans for most small farmers. First, commercial banks are conservative in their loan policies. They have had little previous experience with cooperatives and agricultural financing. Secondly, the lack of resources of most small farmers prevented them from obtaining adequate financing. Finally, to safeguard the rate of loan repayments, lending institutions concentrated their loans in a few cooperatives. Several policy changes could make crop production loans to small farmers through cooperatives more attractive to commercial banks. If commercial banks were provided subsidies for paying the managerial costs of paid secretaries at the cooperative societies, overhead costs of making and collecting small agricultural loans could be reduced. Also, administrative confusion occurs between commercial banks and district cooperative banks over responsibility of financing cooperatives in districts where both banks operate. This leads to delays and higher costs, which discourage farmers from seeking loans. The confusion also adds to repayment problems.
PN-AAB-958 $2.00

**AGRIBUSINESS MANAGEMENT FOR DEVELOPING COUNTRIES, LATIN AMERICA**
(100) Goldberg, R.A.
(101) Harvard University Business School
1974, 428p.

Harvard University
Harvard Business School
Boston, Massachusetts 02163

A description of an agribusiness commodity systems approach to problem-solving and decision-making by private and public managers, and a discussion of the need for using such a systems approach in training on-farm and off-farm managers of public- and private-sector institutions in Central America. Thus the audience for this report includes not only decision-makers in agribusiness and educators training people in agribusiness, but managers in marketing agencies, future markets, cooperatives, joint ventures, government agencies, investment houses, transportation agencies, and other intermediary agencies playing a role in the logistical development of an agribusiness commodity system. The agribusiness commodity system is described as including farm suppliers, farmers, storage operators, processors, wholesalers, and retailers involved in moving commodities from initial inputs and support services to the final consumer. These participants can perform their operations more effectively if they understand the entire system. The systems approach is illustrated by means of an in-depth study of an entire agribusiness system in operation. The commodities selected were the group of nontraditional fruits and vegetables that fitted the priority systems of Central America, including the needs for crop diversification, export potential, and labor utilization. To emphasize the market orientation of the approach, the study started with an analysis of the U.S. consumer market and moved backward to the Central American producers responding to the U.S. consumers' needs. The analysis is the first complete evaluation of the fruit and vegetable system of the U.S., of the various markets involved, transportation systems involved, and the development of fruit and vegetable operations in Central America.
PN-AAC-316 $35.50

**AGRICULTURAL POLICY AND INCOME DISTRIBUTION IN COLOMBIA**
Thirsk, W. R.
1975, 28p.

Rice University
Program of Development Studies
Houston, Texas 77001

Present government price-support policies in Colombia are providing a continuous redistribution of income from the poor to the rich. The real burden of price supports is borne disproportionately by low-income consumers, while most of the benefits accrue to high-income producers. Besides redistributing income, price supports are impairing the overall efficiency of resource allocation in the economy. Another factor blocking rural economic improvements for low-income small farmers is the lack of agricultural credit programs. Most institutional loans go to the large farmers. The single source of institutional financing for smaller farmers is the supervised credit program of the land reform institute. This has accounted for about five percent of total loans outstanding, and has benefited perhaps 35,000 families during the period 1972-1974. That is a small fraction of the 850,000 small farmers, who produce about 20 percent of all crop output and 15 percent of all livestock output. The growth of mechanization on larger farms has also had a negative impact on employment and income distribution. The Colombian experience with mechanization has little to recommend it. It has yielded a negative social payoff and has acted to increase income inequality in a country that already had a highly skewed distribu-

tion of income. Elimination of government subsidies of mechanization would have the twofold effect of improving income distribution and augmenting the level of total income. The land reform programs in Colombia are not very effective. The approximately ten percent of rural workers without any land have never been considered as a target group for land reform activities. Rural educational opportunities for low-income workers are much inferior to urban opportunities. Unless government policy changes can offer rural low-income families increased opportunities, rural to urban migration will increase.
PN-AAC-326 $2.30

### IMPLICATIONS OF GOVERNMENT INTERVENTION IN THE RICE ECONOMY OF SRI LANKA

Edirisinghe, Neville; Poleman, T. T.
1976, 111p.

Cornell University, Department of Agricultural Economics
New York State College of Agriculture
Ithaca, New York 14850

(In Cornell International Agricultural Mimeograph 48)
(Thesis M.S.—Cornell)

The main implications of state intervention in rice marketing as they affect the economy in general and the rice economy in particular. State intervention is not viewed from the standpoint of laissez-faire economic theory, but from the assumption that certain forms of government intervention are needed to activate the economy so as to achieve general welfare. To determine if this has been the result, there is an analysis of the rationality and efficiency of the policies, factors that operate as constraints to realization of the objectives and the possible alternative actions. Following an introduction, Chapter 2 is a historical perspective of the rice economy, and Chapter 3 discusses consumption characteristics, the importance of rice to the average diet, and the economic relationships influencing consumer demand for rice. Chapter 4 examines the degree of success of the rice intensification programs, prospects of growth, and alternative strategies required to effect the necessary growth rates to meet potential future demand. In Chapter 5, government involvement in rice distribution is evaluted and in Chapter 6, the government price policy, operation of the Guaranteed Price Scheme, and factors influencing government paddy procurement are examined. The final section is a discussion of policy implications as related to the earlier evaluation of government policy and other factors.
PN-AAC-332 $9.20

## AGRICULTURAL MARKETING

### ORGANIZATION AND STRUCTURE OF THE MEXICO CITY FLUID MILK INDUSTRY

Kipps, P. H.; Freebairn, D. K.
1971, 37p.

Cornell University, Department of Agricultural Economics
New York State, College of Agriculture
Ithaca, New York 14850

(In Cornell International Agricultural Development Bulletin 22)

The principal determinants of aggregate milk consumption are population, consumer income, and milk prices. For the families surveyed, there was a negative relationship between income and family size and a positive relationship between family income and each of the other associated variables: price paid, proportion of milk drinkers, and average consumption levels. The positive effect of higher incomes on consumption and expenditure diminishes as incomes rise and finally becomes negligible, first for consumption and then for expenditure. Thus an accurate projection of total demand for milk requires that the number, size, and age distribution of families in each of several broad income groups be specified along with their expected rates of growth. The latter includes net immigration and shifts among income groups in addition to the normal biological increase. The principal implications of a significant increase in demand for the fresh milk industry would seem to depend largely on the origin of the increase in demand for family income groups and the public policy toward the regulation of price and produce quality and the production of reconstituted milk. As for the origin of demand, the pasteurized fresh milk industry clearly will experience a greater impact if the increased demand originates primarily in the upper income groups. If chiefly lower income families are responsible for the demand shift, the increased consumption would be limited mainly to unpasteurized and reconstituted milk, given the present structure of production, marketing, and public regulations.
PN-AAC-333 $3.10

## EMPLOYMENT

### AN EVALUATION OF EXPATRIATE LABOR REPLACEMENT IN THE IVORY COAST

Monson, T. D.; Pursell, Garry
1975, 80p.

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

(In Discussion paper no. 49)

This paper is a by-product of a World Bank research project on economic incentives and domestic resource costs in West Africa. It addresses several problems of educational policy posed by the replacement of highly skilled expatriates in the Ivory Coast's labor force. Conceptualizing expatriate replacement as an import-substitution activity in which Ivorian labor substitutes for previously imported labor services, the author applies a modified DRC (domestic resource costs) analysis to evaluate Ivorian secondary and university education programs necessary to train the local labor. The results indicate that training for purposes of expatriate replacement is an economically desirable activity with most potential for gain being at the upper secondary and lower university levels.
PN-AAC-128 $6.65

# EDUCATION

## GENERAL EDUCATION

### THE EFFECTS OF PROSE ORGANIZATION AND INDIVIDUAL DIFFERENCES ON FREE RECALL

James, T. G.; Brown, B. R.
1973, 36p.

Florida State University, Center for Education Technology
College of Education
Talahassee, Florida 32306

(In Computer Applications Laboratory, Working Paper No. 3)

The three objectives of this study were to establish (1) what effect paragraph organization has on the free recall of sentences and on selection of clustering strategies; (2) how persons who differ in subjective organization differ on the free recall of sentences and selection of clustering strategies; and (3) what the relationship is between subjective organization and other task-relevant cognitive abilities. Subjects tested were 75 introductory psychology students at Florida State. Passages organized by

concept names, concept attributes, and also randomized passages were presented to the students for study and recall. The students were then tested for verbal comprehension, verbal creativity, associate memory, closure, and subjective organization. The group that was presented passages organized by concept names recalled more correct statements than the other groups. Clustering by names was dominant for all groups, and unique patterns of correlations were obtained among cognitive factors and recall scores for each group. These results indicated that learning a highly organized passage and using a preferred recall strategy yielded superior recall. The analysis of the subjective organization data indicated that high organizers were not highly influenced by the inherent structure of the learning materials, whereas low organizers were. Thus students low in subjective organization require highly structured materials if they are to recall them adequately, while students high in subjective organization perform similarly on materials with high and low structure.
PN-AAC-533 $3.00

**NEW APTITUDES FOR ADAPTIVE INSTRUCTION: A COMPUTER SIMULATION OF A LEARNING ENVIRONMENT INDIVIDUALIZED BY HUMAN INFORMATION PROCESSES AND REINFORCEMENT CONTINGENCIES**
Kribs, H. D.
1973, 72p.

Florida State University, Center for Educational Technology
College of Education
Talahassee, Florida 32306

(In Computer Applications Laboratory, Working Paper No. 4)

A theoretical discussion of how an instructional system might be represented by a computer simulation. The instructional system would be one that adapts the learning environment to each student's motivational and information processing capabilities. The purposes of the simulation are three: to introduce the combination of human information processing and associated reinforcement contingencies as attributes for individualizing instruction; to model the learning environment resulting from adaption of instruction based on attributes of processes and their reinforcement contingencies; and to specify preliminarily a computer-based adaptive instructional model based on the above-mentioned attributes. Various elements of the simulation are discussed, including means by which students would interact with the computer. The author notes that the simulation as described has not been fully empirically grounded, but is to be considered as a conceptual framework in which measures of information processing and reinforcement become relevant to instruction.
PN-AAC-534 $6.00

**MULTIVARIATE EFFECT OF APTITUDE AND ANXIETY WITH PERFORMANCE ON TASK SEQUENCE IN CONCEPT ACQUISITION**
Tennyson, R. D.; Boutwell, R. C.
1973, 21p.

Florida State University, Center for Educational Technology
College of Education
Talahassee, Florida 32306

(In Computer Applications Laboratory, Working Paper No. 2)

An exploration of some relationships between college students' learning aptitudes, state of anxiety, and learning performance in two types of task sequences; (1) a sequence in which the materials were arranged in easy-to-hard order; and (2) a sequence in which they were arranged in hard-to-easy order. Three hypotheses were investigated, using 81 volunteer Florida State University students from general psychology classes. The first hypothesis was that the anxiety level of a learner while he is engaged in performing learning tasks is a better predictor of his performance than his anxiety level before he begins the tasks. The study findings affirmed that. The second hypothesis was that learners as a group would perform better in easy-to-hard task sequences than in hard-to-easy sequences. The study findings confirmed that. The third hypothesis was that task sequence would affect anxiety levels during performance of the sequence of tasks, and result in a disordinal interaction. This too was confirmed. The results showed very little correlation between pre-task anxiety levels and performance, or between pre-task and within-task anxiety levels. The larger purposes of this research involve developing more effective programmed learning materials for individualized instruction.
PN-AAC-535 $2.00

**PRE-TASK VERSUS WITHIN-TASK ANXIETY MEASURES IN PREDICTING PERFORMANCE ON A CONCEPT ACQUISITION TASK**
Tennyson, R. D.; Boutwell, R.C.
1973, 16p.

Florida State University, Center for Educational Technology
College of Education
Talahassee, Florida 32306

(In Computer Applications Laboratory, Working Paper No. 1)

This paper describes a study designed to investigate whether within-task measures of the anxiety of a learner are significantly better predictors of learner performance than pre-task trait or state measures of anxiety. A time series design was used to obtain the subjects' typical anxiety level during a task that involved identifying $RX_2$ atom crystals. Regression analyses of the study findings showed that the within-task anxiety measure was a significant predictor of performance. Repeated measurements of trait and state anxiety demonstrated that anxiety fluctuated over time, and that environmental changes affected state anxiety. The implications of the study are that aptitude-treatment interactions using within-task measures may be more useful in designing adaptive instruction than the current notion of using pre-task measures of anxiety.
PN-AAC-536 $2.00

**DRAFT MODEL FOR DEVELOPMENT OF A NATIONAL UNIVERSITY CENTER FOR EDUCATIONAL TECHNOLOGY**
(101) Florida State University Center for Educational Technology
1973, 45p.

Florida State University, College of Education
Center for Educational Technology
Tallahassee, Florida 32306

Much that has traditionally been honored in conventional educational practice is obsolete and irrelevant, yet the nation has not injected in its university system a center and program to make use of an engineering approach in applying new knowledge to improvements in the human learning process. That would be the function of a national university center for educational technology. Such a center would offer a Master's degree in educational technology, and would conduct research and service activities as part of an interface with other universities, lower schools, government agencies, and the community at large. Educational technology is defined as the systematic integration and utilization of knowledge, research, and invention in the facilitation of the human learning process. Important concepts and techniques in this approach include systematic management and planning (PPBS, PERT, cost-effectiveness analysis), individualized in-

struction, performance objectives, criterion-referenced evaluation, instructional design and validation, programmed instruction, instructional radio and TV, computer applications (CAI, CMI), peer tutoring, and other largely unutilized new techniques. The Master's degree program in educational technology would offer specializations in curriculum development, or planning and management. The planned functions and facilities of the proposed center are described in some detail.
PN-AAC-540 $3.75

**TECNOLOGIA EDUCATIVA Y CURRICULUM MANUAL DE TRABAJO**
(101) Florida State University Center for Educational Technology; Organization de Estados Americanos
1973, 67p.

Florida State University, College of Education
Center for Educational Technology
Tallahassee, Florida 32306
PN-AAC-543 - In Spanish $5.55

**A GOAL PROGRAMMING MODEL FOR ANALYZING EDUCATIONAL INPUT POLICY WITH APPLICATION FOR KOREA**
Lee, Chong-jae
1974, 175p.

Florida State University
College of Education
Gainesville, Florida 32601

(Dissertation—Florida State)

The objective of this dissertation was to develop an educational input policy planning model of national educational planning in Korea, using a hypothetical planning situation. In developing a policy planning model the contributions and implications of a central policy are usually analyzed and planned in the context of their relationship to the objectives of the system under study. To illustrate the modeling approach, five administrative goals were selected and defined. Four goal-priority situations were then designed by assigning different priorities to those goals. Two types of educational input policy were formulated in terms of (1) student/teacher ratio; (2) average teacher's salary; (3) students per classroom; and (4) allocation of financial resources to instructional materials and equipment. Each policy, regarded as one of the coefficients of the goal-programming model, was tested on the goal-programming computer model. The output of the computer program showed the optimal solution and the level of underachievement of the goals. The future educational system was forecasted, based on the optimal solution.
PN-AAC-560 $14.50

# PUBLIC HEALTH

## NUTRITION

The four publications listed below have appeared in earlier issues of this journal. They are listed here as a reminder that free copies are available from:

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

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

**VITAMIN A, XEROPHTHALMIA, AND BLINDNESS: A STATUS REPORT IN THREE VOLUMES - VOLUME 1: A GLOBAL SURVEY OF MASS VITAMIN A PROGRAMS**
Kamel, W. W.
July 1973, 53p.

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

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523
PN-AAB-386 $4.40

**VITAMIN A, XEROPHTHALMIA, AND BLINDNESS: A STATUS REPORT IN THREE VOLUMES - VOLUME II: VITAMIN A PROBLEMS WITH SPECIAL REFERENCE TO LESS DEVELOPED COUNTRIES**
van Veen, A. G.; van Veen, M. S.
July 1973, 59p.

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

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523
PN-AAB-387 $4.90

**VITAMIN A, XEROPHTAHALMIA, AND BLINDNESS: A STATUS REPORT IN THREE VOLUMES - VOLUME III: VITAMIN A TECHNOLOGY**
Bauernfeind, J. C.
July 1973, 132p.

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

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523
PN-AAB-388 $10.95

**A FIELD GUIDE FOR EVALUATION OF NUTRITION EDUCATION: AN EXPERIMENTAL APPROACH TO DETERMINATION OF EFFECTS ON FOOD BEHAVIOR IN LESSER DEVELOPED COUNTRIES**
Agency for International Development
June 1975, 101p.

Agency for International Development, Office of Nutrition
Technical Assistance Bureau
Washingtion, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523
PN-AAC-202 $8.40

**CRITICAL EVALUATION OF NEW OR ENRICHED PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION; PROGRESS REPORT, 1971/1972**
British American Hospital, Lima, Peru
1972, 6p.

British-American Hospital
Instituto de Investigacion Nutricional
Lima, Peru

A very brief outline of progress in UNICEF's corn-soy milk mixture (Mx-86) project (excellent nutritional value), Peru's wheat-chick pea-soy mixture (HPF-16) (moderately high nutri-

tional value), Brazil's Mandioca-soy protein isolate mixture (mixed results), Ralston-Purina's soy protein isolate (results not yet complete), International Milling's wheat-based product, PBB (modest nutritional value), a fish protein concentrate (results not yet complete), and research on the low intestinal lactase activity in non-white races (on-going). Short reports of expenditures and the proposed budget also are included.
PN-AAC-576 $2.00

**CRITICAL EVALUATION OF NEW OR ENRICHED PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, PROGRESS REPORT ON PROCESSED BASIC BLEND**
Graham, G. G.; British-American Hospital, Lima, Peru
1973, 12p.

British-American Hospital
Instituto de Investigacion Nutricional
Lima, Peru

Three studies, two using five convalescent malnourished infants and the other, one convalescent malnourished infant, showed that potentially this is a very useful product. It probably is well-balanced in its amino acid composition, with its utilization limited primarily by digestibility. This requires the provision of at least 8.0% of calories as protein in the diet of children receiving this as their main source of protein, though 10% probably would be safer.
PN-AAC-577 $2.00

**CRITICAL EVALUATION OF NEW OR ENRICHED PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, PROGRESS REPORT ON SPRAY DRIED SOY-WHEY-FORMULATION**
Graham, G. G.; British-American Hospital, Lima, Peru
1973, 9p.

British-American Hospital
Instituto de Investigacion Nutricional
Lima, Peru

The limited number of studies with this product gave such consistently good results that it can be stated confidently that the soy-whey mixture is an excellent source of dietary protein. Despite moderately inferior nitrogen absorption, probably attributable to the soy flour, the retentions were the equal of those from casein. In all of the studies there was a consistent tendency for serum albumin to fall off slightly during the Mx-37 dietary periods. This is consistent enough to be significant, although in most cases the serum albumin still remained in the normal range. This probably is due to the fact that the mixture undoubtedly has methionine as its first-limiting amino acid. If it provides at least 8% of calories as protein, this product can be recommended as the only source of protein in the diet of infants and children.
PN-AAC-578 $2.00

**CRITICAL EVALUATION OF NEW OR ENRICHED PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, PROGRESS REPORT ON WHEY-SOY MIX**
Graham, G. G.; British-American Hospital, Lima, Peru
1974, 20p.

British-American Hospital, Instituto de Investigacion Nutricional
Lima, Peru

A whey-soy mix, designed to be used in preschool feeding programs, was compared to casein in eight nitrogen balance studies done with protein providing 6.4% of calories, and was studied as well as the prolonged source of protein (8% of calories) in the prolonged feeding of four other infants. Whey-soy proved to be significantly inferior to casein in nitrogen retention, partly on the basis of poor digestibility and partly because of a presumed biologic value. Stool weights and fecal fats did not differ significantly in the two diets. Children consuming whey-soy as the only source of protein showed good increases in weight age with lesser increases in length, a normal finding. Serum albumin concentrations generally were well-maintained. No intolerance to whey-soy was encountered. Possible limitations in the use of whey-soy in field situations must be taken into account, but it should prove to be of great value even in the diets of weaned infants.
PN-AAC-579 $2.00

**CRITICAL EVALUATION OF NEW PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, SUBSTANTIVE PROGRESS REPORT ON COTTONSEED FLOURS: PART II**
Graham, G. G.; British-American Hospital, Lima Peru
1967, 10p.

British-American Hospital
Department of Research
Lima, Peru

Results with glandless cottonseed flour were somewhat paradoxical. Compared to modified cow's milk, the absorption and retention of nitrogen were distinctly superior to what would have been expected with "degossypolized" cottonseed flour. Rates of weight gain also were superior and the levels of serum albumin attained were quite comparable to those from "degossypolized" cottonseed flour in other subjects. In these studies, as well as in the initial treatment of malnourished infants, there was a more pronounced tendency for sodium to be retained and a distinctly greater tendency to develop pellagra-like manifestations. Although the latter is suspected of being related to the unavailability of tryptophan, inadequate for pyridine nucleotide synthesis, this cannot be proved at this time. Based on these studies, however, it is believed that as part of a mixture containing natural foods, this cottonseed flour would prove superior to those from ordinary cottonseed meal which has been "degossypolized" by physical or chemical methods.
PN-AAC-580 $2.00

**CRITICAL EVALUATION OF NEW PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, PARTIAL PROGRESS REPORT ON A WHEAT-SOY BLEND**
Graham, G. G.; British-American Hospital, Lima, Peru
1969, 9p.

British-American Hospital
Department of Research
Lima, Peru

These studies suggest that this wheat-soy blend can serve very well as the main source of protein in the diet of rapidly growing infants and children when its protein provides at least 8% of total calories. It can do this while providing only 30% of total calories, giving it a very wide margin of safety when diluted with other dietary sources of energy. This product is worthy of consideration for mass-feeding programs and is particularly attractive in view of the increasing amount of evidence that nearly all the colored races have a very high percentage of people who cannot tolerate the lactose of milk products beyond the usual weaning age. Their very low levels of intestinal lactose activity explain their heretofore misunderstood rejection of milk supplements.
PN-AAC-581 $2.00

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

**CRITICAL EVALUATION OF NEW PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, PROGRESS REPORT ON CORNMEAL-SOY-MILK MISTURE**
Graham, G. G.; British-American Hospital, Lima, Peru
1969, 19p.

British-American Hospital
Department of Research
Lima, Peru

The protein of CSM, a cornmeal-soy flour-milk solids mixture now being used extensively in child feeding, has been demonstrated to have a biological value approximately two-thirds of that of casein. To be the main source of protein in the diet it should provide 12% of total calories as protein. Its digestibility is relatively poor, as is that of most vegetable mixtures. Its biological value might be enhanced by methionine enrichment or by improving its digestibility.
PN-AAC-582 $2.00

**CRITICAL EVALUATION OF NEW PROTEIN SOURCES FOR THE PREVENTION OF MALNUTRITION, REPORT ON Ms-15, A WHEAT FLOUR-WHEAT CONCENTRATE MIX**
Graham, G. G.; British-American Hospital, Lima, Peru
1969, 14p.

British-American Hospital
Department of Research
Lima, Peru

Evaluation of a mixture of unbleached wheat flour and protein concentrate from wheat shorts. The protein content of the mixture was 18.8%, and it retained most of the characteristics of wheat flour. Since approximately two-thirds of its protein came from the shorts, with a higher content of lysine than the flour, its biological value theoretically should be higher than that of wheat flour. A mixture of equal pars of unbleached wheat flour and protein concentrate from shorts has been shown to have a protein value for infants and small children of approximately 60% of that of casein. Lysine fortification produced a 50% enhancement in protein value. Further improvement probably was limited by moderately inferior digestibility.
PN-AAC-583 $2.00

**DIETARY PROTEIN QUALITY IN INFANTS AND CHILDREN: II. METABOLIC STUDIES WITH COTTONSEED FLOUR**
Graham, G. G.; Morales, Enrique; Acevedo, Gladys; Baerti, J. M.; Cordano, Angel
1969, 11p.

British-American Hospital
Department of Research
Lima, Peru

(In American Journal of Clinical Nutrition, v. 22, no. 5, p. 577-587)

Nitrogen-balance studies in convalescent malnourished infants and children have been used to determine the apparent biological value of the protein in a number of cottonseed flours. A "glandless" CSF proved to approximate most closely the value of milk protein. Cottonseed flour prepared by azeotropic solvent extraction was next in apparent quality and a CSF prepared by heat processing and screw-press extraction gave the poorest results. Cottonseed flour prepared in Peru by combining wet cooking and hexane extraction of a relatively low gossypol variety was no better than this last product. The "glandless" CSF, if used as the main or only source of protein in the diet of infants and children, should provide 8-10% of calories as protein. For the solvent-extracted CSF, a minimum of 10% protein calories seems indicated and for the heat-press extracted CSF, 12% protein calories. These results indicate that both the origin of CSF and the manner of its processing have important effects on the nutritive value of its protein. They suggest that at appropriate levels, a properly processed CSF can be the main or only source of protein in the diets of infants and children. Prolonged feeding trials are necessary to confirm or deny these observations.
PN-AAC-584 $2.00

**DIETARY PROTEIN QUALITY IN INFANTS AND CHILDREN: III. PROLONGED FEEDING OF COTTONSEED FLOUR**
Graham, G. G.; Morales, Enrique; Acevedo, Gladys; Baerti, J. M.; Cordano, Angel
1970, 5p.

British-American Hospital
Department of Research
Lima, Peru

(In American Journal of Clinical Nutrition, v. 23, no. 2, p. 165-169)

Previous comparative metabolic studies were reported in which cottonseed flour (CSF) served as the only source of protein in the diet of convalescent malnourished infants and children. 1) Cottonseed flour from glandless cottonseed (CF-26) appeared to have the highest biological value, with azeotropic solvent-extracted flours (CF-21/27) approximating its value closely, and CSF prepared by heat processing and a screw-press extraction (CF-22) having a distinctly lower value. Although rates of weight gain and changes in serum albumin levels were reported, it was made clear that in such short-term studies they were not reliable indicators of protein quality, and that only the apparent nitrogen retentions were of significance. This report covers experiments with prolonged feeding of the same CSF's as the only source of dietary protein to some of the same and a few additional infants and children. The duration of the diet periods was such that rates of weight gain, increments in height (recumbent length), and changes in serum albumin levels could be considered indicators of dietary protein adequacy.
PN-AAC-585 $2.00

**DIETARY PROTEIN QUALITY IN INFANTS AND CHILDREN: IV. A CORN-SOY-MILK BLEND**
Graham, G. G.; Morales, Enrique; Acevedo, Gladys; Placko, R. P.; Cordano, Angel
1971, 7p.

British-American Hospital
Department of Research
Lima, Peru

(In American Journal of Clinical Nutrition, v. 24, p. 416-422)

The protein of CSM, a cornmeal-soy flour-milk solids mixture now being used extensively in child feeding, has been demonstrated to have a biological value approximately two-thirds of that of casein. To be the main source of protein in the diet it should provide 12% of total calories as protein. Its digestibility is relatively poor, as is that of most vegetable mixtures. Its biological value might be enhanced by methionine enrichment or by improving its digestibility.
PN-AAC-586 $2.00

**DIETARY PROTEIN QUALITY IN INFANTS AND CHILDREN: V.A. WHEAT FLOUR-WHEAT CONCENTRATE MIXTURE**
Graham, G. G.; Cordano, Angel; Morales, Enrique, Acevedo, Gladys; Placko, R. P.
1970, 5p.

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

British-American Hospital
Department of Research
Lima, Peru

(In Plant Foods for Human Nutrition, v. 2, p. 23-27)

Evaluation of a mixture of unbleached wheat flour and protein concentrate from wheat shorts. The protein content of the mixture was 18.8% and it retained most of the characteristics of wheat flour. Since approximately two-thirds of its protein came from the shorts, with a higher content of lysine than the flour, its biological value theoretically should be higher than that of wheat flour. A mixture of equal parts of unbleached wheat flour and protein concentrate from shorts has been shown to have a protein value for infants and small children of approximately 60% of that of casein. Lysine fortification produced a 50% enhancement in protein value. Further improvement probably was limited by moderately inferior digestibility.
PN-AAC-587 $2.00

**DIETARY PROTEIN QUALITY IN INFANTS AND CHILDREN: VI ISOLATED SOY PROTEIN MILK**
Graham, G. G.; Placko, R. P.; Morales, Enrique; Acevedo, Gladys; Cordano, Angel
1972, 5p.

British-American Hospital
Department of Research
Lima, Peru

(In American Journal of the Diseases of Children, v. 120, p. 419-423)

Milks based on isolated soy protein enriched with DL-methionine rapidly are coming into use in pediatric practice. The biological value of its protein has been measured at critical levels in the initial therapy of malnourished infants and children and during convalescence. Absorption and retention of nitrogen, as well as growth rates, were equivalent to those from modified cow's milk. Normal serum albumin levels were achieved and maintained, as were levels of fasting plasma amino acids, both indicative of dietary protein adequacy. These results confirm the enormous potential of isolated soy protein in human nutrition, particularly in the diet of those intolerant of milk proteins or lactose.
PN-AAC-588 $2.00

**PARTIAL DIETARY REPLACEMENT OF MILK PROTEIN BY NONSPECIFIC NITROGEN IN YOUNG MEN**
Scrimshaw, N. S.; Young, V. R.; Huang, P. C.; Thanangkul, O.; Cholakos, B. V.
1969, 9p.

Massachusetts Institute of Technology
Department of Nutrition and Food Science
Boston, Massachusetts 02139

(In Journal of Nutrition, v. 98, no 1, p. 9-17)

Skim milk protein was replaced isonitorgenously by glycine and diammonium citrate, or by a mixture of non-essential amino acids in the test diet of 21 male college students; the effect of this replacement on urinary nitrogen and sulfur excretion and on fasting plasma amino acid concentration was studied. The subjects were fed a constant nitrogen intake equivalent to 0.38 g protein/kg body weight. Skim milk protein furnished 90% of the daily protein; oatmeal furnished the remainder. In experiments 1 and 2, glycine and diammonium citrate replaced 20 and 25% of total dietary nitrogen, respectively. In experiment 3, a mixture of non-essential amino acids replaced 25% of dietary nitrogen. The 20% replacement with glycine and diammonium citrate did not increase urinary nitrogen excretion in any of the seven subjects, but three of the seven showed lower urinary nitrogen excretion in any of the seven subjects, but three of the seven showed lower urinary nitrogen exretion after return to the basal diet. A 25% replacement with glycine and diammonium citrate increased urinary nitrogen excretion in three of seven subjects and four subjects showed lower nitrogen output during the final basal period. The 25% replacement with non-essential amino acids did not change urinary nitrogen excretion but three of ten subjects showed a variable decrease in nitrogen excretion during the second basal period. As a replacement for 25% of total dietary protein, non-essential amino acids appeared a more effective non-specific nitrogen source than glycine and diammonium citrate. Fasting plasma amino acid levels were unchanged during the experimental periods.
PN-AAC-590 $2.00

The following 37 publications were not produced under the sponsorship of the Agency for International Development. However, the Agency's Office of Nutrition considered them to be of general value and has copies available without charge so long as the supply lasts.

**THIRD FAR EAST SYMPOSIUM ON NUTRITION, MANILA, PHILIPPINES, FEBRUARY 14-21, 1967**
National Institutes of Health/The Republic of the Philippines
1967, 317p.

National Institutes of Health
Office of International Research, Nutrition Section
Bethesda, Maryland 20014

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A report of the formal papers presented at the Symposium, together with the discussions that followed. Subjects included progress reports on nutrition work and programs in the participating countries, problems of nutrition and malnutrition in infants and children, maternal and child health with emphasis on nutrition, prevention and control of vitamin A deficiency, problems in military nutrition, organization of national nutrition programs, community mothercraft centers, nutrition education and ecological awareness, household food consumption surveys, and the genetic factor in endemic goiter. No general recommendations were offered.

**SEMINAR ON THE FOOD INDUSTRY IN WEST AFRICA**
University of Ghana
December 1975, 142p.

University of Ghana
Department of Nutrition and Food Science
Legon, Ghana

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The theme of the Seminar was the examination of the present and future needs of the food industry in West Africa, and the relevance of present teaching programs to the needs of that industry. This report includes the papers presented but not the discussion following the presentation, except in Section III in which it was an integral part of the topic. The papers have been classified into three sections. Section I deals with food industries in Ghana, Ivory Coast, and Nigeria. The second section outlines possible new developments and trends in some important commodity areas of the food industry. In the third section there is a discussion of food science and technology teaching programs, their

content, relevance, and role in solving food problems in West Africa. No general recommendations are given.

### MATERNAL NUTRITION AND THE COURSE OF PREGNANCY: SUMMARY REPORT

National Academy of Sciences
1970, 23p.

Committee on Maternal Nutrition/Food and Nutrition Board
National Research Council
National Academy of Sciences
Washington, D.C. 20418

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This summary report on the role of nutrition in human reproduction presents the major findings, conclusions, and recommendations of a larger volume with the same title. The study here summarized grew out of concern about the relatively high neonatal and infant mortality rates in the United States, rates that have persisted at levels well above those of many western countries. It provides an authoritative review of available information and practical guidelines that can assist professionals in the health field to improve nutrition services for pregnant women and their families. The study also sought to identify areas and problems requiring further study, and to develop recommendations for improving the education of professionals in prenatal and child care. The topics discussed in this summary report include the epidemiology of human reproductive casualities; maternal physiological adjustments; anemias complicating pregnancy and the puerperium; and the relation of nutrition to fetal growth and development, pregnancy in adolescence, and toxemias of pregnancy. A section on recommendations include specific recommendations relating to the organization and conduct of maternal and child health programs; the need for research emphases on the study of the normal physiological adjustments that take place during pregnancy; and types of epidemiological and field studies needed.

### NUTRITION, DEVELOPMENT AND SOCIAL BEHAVIOR (DHEW PUBLICATION NO. (NIH) 73-242)

U.S. Department of Health, Education and Welfare, Pan American Health Organization, Michigan State University
1971, 386p.

U.S. Department of Health, Education and Welfare
Public Health Service
National Institutes of Health
Bethesda, Maryland 20014

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This volume summarizes the proceedings of a Western Hemisphere Conference on "The Assessment of Tests of Behavior from Studies of Nutrition in the Western Hemisphere," held in Puerto Rico October 20-23, 1970, under sponsorship of the National Institute of Child Health and Human Development and the Pan American Health Organization. The conference was concerned with methodologic problems in field studies on nutrition and mental development, the social setting of malnutrition and its impact on intellectual growth, and the possible relation between malnutrition and social growth or functional competence. The 33 scientists who participated in the Conference represented the disciplines of pediatrics, nutrition, psychology, sociology, anthropology, and public health. Approximately half of the participants were from the U.S. and half from Latin America, representing mainly institutions engaged in conducting research on these and related subjects. A few points here are excerpted from some of the discussion summaries: The problem of ascertaining the role of genetics in the relationship between nutrition and mental development poses significant problems. Genetic inputs cannot be separated from environmental inputs, and nothing has ever been learned about genetics except in environment. A new mathematical model is needed, in which the interaction term is the center of the analysis. This newer model would take full account of the fact that there is never a separation between genetics and environment. Nutritional effects may well be one of the particular features of the environmental mix which does contribute to variance. Given the present level of knowledge and understanding, discussion of the relationship between nutrition and mental development tends to assume proof of a causal relationship. Based on our current knowledge, this is unjustified. If such a relationship does exist, the mechanisms through which it is created are far from clear.

### NUTRITION AND DEVELOPING COUNTRIES (WITH SPECIAL REFERENCE TO THE MAIZE, CASSAVA AND MILLET AREAS OF AFRICA)

King, M. H.; King, F. M.; Morley, D. C.; Burgess, H. J.; and Burgess, A. P.
1972, 235p.

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The purpose of this book is to show its reader how to feed his own children, how to teach other people to do the same, how to make the community diagnosis of malnutrition in his district, how to initiate community health action, and how to supervise the growth of children using a weight chart. A radical approach has been taken; much conventional material has been omitted, especially in respect to vitamins, while greater emphasis than usual has been placed on the proteins and on protein-joule (calorie) malnutrition. Because the purpose of applied nutrition is to achieve effective action, great attention has been paid to the practical aspects of nutrition teaching, which have been described as "things to do" at the end of each chapter. Most of the book is written in simple English using a strictly limited vocabulary and syntax. Specific chapter headings are: 1) Growth; 2) When Growth Fails; 3) Proteins; 4) Energy Foods, Vitamins and Minerals, Non-foods and Water; 5) More about Food; 6) The Need for Food and its Cost; 7) Feeding the Family; 8) Artificial Feeding; 9) The Food Path; 10) Helping Families to Help Themselves; and 11) Help the Community to Help Itself.

### CONQUEST OF DEFICIENCY DISEASES, ACHIEVEMENTS AND PROSPECTS (BASIC STUDY NO. 24)

Aykroyd, W. R.
1970, 98p.

World Health Organization, Geneva, Switzerland

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This booklet traces the history of various deficiency diseases and examined the reasons why some have declined while others still persist. It is of particular value to persons concerned with planning and implementing measures for the control of nutritional diseases that are now prevalent in developing nations. The emphasis throughout is on epidemiological patterns, particularly with respect to time. Attention is focused on the setting in which the diseases occur, and on changes in it over the years. With regard to each deficiency disease, an attempt is made to answer the following questions: What has happened in the past? What is happening now? What is likely to happen in the future? Deficiency diseases are divided into two groups: those which, if not

completely eliminated, have at least become uncommon in comparison with earlier prevalence; and those which are still far from being prevented, even though their cause is known. In the first group fall four major vitamin-deficiency diseases: beriberi, pellagra, rickets, and scurvy. In the second group fall protein-calorie malnutrition, vitamin-A deficiency, endemic goiter, nutritional anemias, and other deficiency diseases. The largest chapter of this booklet, on protein-calorie malnutrition, contains sections of definitions, age groups affected, etiological factors, weaning, nutritional dwarfing, the prevalence of protein-calorie malnutrition, mortality rates in infancy and early childhood, weanling diarrhoea, trends in prevalence of kwashiorkor, the effects of urbanization, research and preventive actions, and future priorities.

### CONTROL OF NUTRITIONAL ANEMIA WITH SPECIAL REFERENCE TO IRON DEFICIENCY - REPORT ON AN IAEA/USAID/WHO JOINT MEETING (TECHNICAL REPORT SERIES 580)

World Health Organization
1975, 71p.

World Health Organization
Geneva, Switzerland

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This report presents the results of a meeting of experts on nutritional anemia. They convened in Geneva in November, 1974, to review information on the effects of anemia, recent advances in the field of iron and folate nutrition, and ways of combating nutritional anemia through dietary supplementation and fortification. Each of those subjects is discussed in some detail. Among the chief conclusions and recommendations discussed in more detail in the report are the following: The WHO iron reference center in Seattle, Washington, has performed valuable services relating to standardization of serum iron estimations. The newly developed radiommunoassay of serum ferritin appears to be an excellent method of assessing iron stores and may be of particular value for determining changes in iron balance brought about by supplementation or fortification. The detrimental effects of mild anemia, and of iron and folate deficiency without anemia, must be more precisely defined. Concerning the availability of iron from different diets, only recently have accurate isotopic methods become available with which absorption can be quantified. Studies done with these methods have revealed major differences in the availability of iron from different diets. Such studies should be conducted on typical diets from different areas. As for supplementation, in population groups where there is a high prevalence of nutritional anemia, pilot therapeutic supplementation trials should be undertaken. As for fortification with iron, this is now practiced in several developed countries, but studies should be undertaken to determine the absorbability of the added iron. In populations with a high prevalence of folate deficiency, attempts should be made to find a suitable vehicle for folate fortification, and trials should be conducted to determine the feasibility and effectiveness of this fortification. The combating of nutritional anemia will require trained personnel at all levels, from medical officers to public health workers, food technologists, chemists, and agriculturists. Several regional centers should be established to assist in the training program and to act as reference and standardization centers for neighboring countries. Institutions experienced in developing and applying the more complicated laboratory methods should be encouraged to assist research groups with more limited resources and capability.

### CHILD CARE - A HANDBOOK FOR VILLAGE WORKERS AND LEADERS

Keister, M. E.
1967, 58p.

Food and Agriculture Organization
of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A very simplified text, accompanied by many explanatory drawings. Each of the handbook's twelve chapters contains four sections: 1) important points to be emphasized; theory or facts and principles for the leader to convey to the mothers throughout the lesson. 2) Activities to make learning interesting and vital; suggestions for practical work and demonstrations requiring active participation by mothers or trainees. 3) Suggestions for teaching aids, materials, and equipment which will help make the lesson more lively. 4) Suggestions for follow-up of the lesson and/or review of material which has been taught earlier and which is related to the particular lesson. Subjects covered include preparing a safe and a healthy world for babies and children; their growing and learning; school; sleeping, resting, and playing; proper clothing; and keeping children well and happy.

### MILK AND MILK PRODUCTS IN HUMAN NUTRITION (FAO NUTRITIONAL STUDIES NO. 27)

Kon, S. K.
1970, 80p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This booklet is intended for the practical use of international workers and their national counterparts — dairy experts, health specialists, nutritionists, home economists, milk engineers — concerned in various ways with milk and milk products. It is also designed for a wider public, as a means of spreading knowledge of a class of food of special importance from a nutritional standpoint. Its first section discusses the composition and nutritional standpoint. Its first section discusses the composition and nutritive value of milk. This includes separate discussions of human milk, cow's milk, and milk from buffalos, goats, ewes, mares, asses, camels, yaks, llamas, and reindeer. The next section discusses treated liquid milk and milk products: pasteurization, processing, packaging, transport, nutritive value; the processing and nutritive value of sterilized milk; heat treatments of milk; reconstituted, toned, skim, evaporated, condensed, dried, flavored, and enriched milk; ice cream, soured and fermented milks, butter and ghee, cheeses, whey, and cream. The third section treats the place of milk and milk products in national diets. Discussed are levels of consumption, imitation milks, and their specific contributions of calories, proteins, vitamins, and minerals. The fourth and final section treats the use of milk and milk products in child-feeding schemes. Discussions include factors influencing the use of milk and milk products in child-feeding schemes; types of supplementary child-feeding programs; effects on health; opportunities for education in nutrition; and future possibilities, with particular emphasis on the value and promise of the use of dried skim milk.

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

**LIVES IN PERIL, PROTEIN AND THE CHILD (WORLD FOOD PROBLEMS NO. 12)**
Food and Agriculture Organization of the United Nations
1970, 52p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies in English, French, and Spanish may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

Of the 800 million children now growing up in the developing countries, more than two-thirds of them will encounter sickness or disabling diseases either brought on or aggravated by protein-calory malnutrition. The very young are particularly vulnerable, because they need not only relatively more food than adults but food of higher protein-calory quality. Malnutrition is the biggest single contributor to child mortality in the developing countries. Breast feeding is usually the best means of assuring infants adequate nutrition. The trend away from it needs to be reversed. In rural areas, where money to buy commercial weaning products is not generally available, the best solution is to concentrate on production of food and to encourage cultivation of crops needed to provide a full complement of amino acids. FAO, WHO, and UNICEF have collaborated in assisting some countries in developing programs which combine nutrition education with local production and consumption of vegetables, fruit, poultry, eggs, fish, and meat. Protein supplies in the early 1960s fell short of requirements in most of the developing countries. Predictions for the future, made by FAO as part of its Indicative World Plan, continue to be pessimistic for most parts of the developing world. The greatest prospects for increasing the supplies of food still rest largely in advancing traditional agriculture in the tropics and subtropics.

**MANUAL ON FOOD AND NUTRITION POLICY (FAO NUTRITIONAL STUDIES NO. 22)**
Johnston, B. F.; Greaves, J. P.
1969, 95p.

Food and Agricultural Organization of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This manual is intended to assist those concerned with practical problems involved in orienting food policies and plans toward the fulfillment of nutritional needs of people in developing countries. It deals mainly with the nutritional aspects of food policy. For many developing countries, attainment of adequate nuritional levels is of necessity a long-term goal that can only be reached by achieving substantial increases in productivity and agricultural output. Thus attention must often be focused on intermediate goals for nutritional improvement, established in relation to a country's overall development plans. The food supply in many developing countries is deteriorating, as population increases outstrip increases in agricultural production. As more people become dependent on a relatively lesser food supply, the consequent rise in food prices may be aggravated by a country's need to restrict food imports in order to conserve foreign exchange, thus lessening the supply and raising prices still further. The first chapter of this booklet discusses interrelationships between food and nutrition policies and development. The second deals with food and nutrition policies related to farm population, the nonfarm population, and special groups. The third discusses the importance of assessing the food and nutrition situation, and information required to do so. The fourth chapter concerns identification of the main nutritional problems, appraisal of agricultural development plans, desirable trends in food consumption, and programs to put into effect food and nutrition policies. Next discussed are means of increasing agricultural productivity, food imports, food aid, food technology, protection of the consumer, and the role of nutrition education. This is followed by discussions of the organization and coordination of national food and nutrition organizations, including their evaluation. The final chapter deals with nutrition research and training programs.

**HANDBOOK OF HUMAN NUTRITIONAL REQUIREMENTS (FAO NUTRITIONAL STUDIES NO. 28; WHO MONOGRAPH SERIES NO. 61)**
Passmore, R; Nicol, B. M.; Rao, M. Narayana; Beaton, G. H.; DeMayer, E. M.
1974, 70p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

In the last twenty years, FAO and WHO have convened eight meetings of Expert Groups, which have reported on energy requirements (calories) and essential nutrients. The texts of the resulting reports have been voluminous and quite technical; hence they are not easy reading for nonspecialists in biochemistry, physiology, and clinical medicine. This handbook presents the specific recommendations for nutrient intakes made by these Expert Groups, and provides a commentary written so as to be more readily understandable to food administrators, agricultural planners, and applied nutritionists. It is also hoped this handbook will prove useful to teachers in secondary schools and colleges and to everyone concerned with health education. An important element of this handbook is a comprehensive table that presents recommended amounts of daily intakes of nutrients for children, male adolescents, and female adolescents (by age groups); the adult man, adult woman, the pregnant woman, and lactating woman. Energy requirements for each are expressed in kilocalories and megajoules. Recommended intakes of vitamins and minerals for each class of human are expressed in grams, micrograms, or milligrams. Intakes are specified for protein, vitamin A, vitamin D, thiamine, riboflavin, niacin, folic acid, vitamin B12, ascorbic acid, calcium, and iron. Chapters of the book that discuss these recommended intakes discuss energy, proteins, each of the vitamins, calcium, iron, iodine, flourine, and other trace elements essential for human nutrition. Additional tables present energy expenditure variations for a reference man and reference woman, depending on their activity level (light, moderate, very active, exceptionally active).

**WHEAT IN HUMAN NUTRITION (FAO NUTRITIONAL STUDIES NO. 23)**
Aykroyd, W. R.: Doughty, J.
1970, 163p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This book draws a broad picture of the place of wheat in the human diet in the past and at present, with some indication of the place it is likely to occupy in the future. It traces the origins and history of wheat, summarizes knowledge on its nutritive value, its production and consumption, forms in which it is eaten, ways in which it has been fortified to enhance its food value, means of milling wheat, relationships between wheat consumption and

such diseases as beriberi, pellagra, dental caries, and coeliac disease, trends in wheat consumption, and the place of wheat in the race between population and food supply. The authors conclude that wheat, as a crop which flourishes in a wide range of environments, lends itself to scientific development and mechanization; world production is rapidly expanding, as are transport and storage methods; dwarf varieties of wheat suited to warm climates have been introduced into India, Pakistan, and Turkey, and are providing yields two or three times greater than native varieties. However, the production of enough fertilizer in India is a problem, as are also adequate storage facilities for fertilizers, seed, pesticides, and harvested grains. But even partial success with the new varieties would make India and Pakistan self-sufficient in wheat within a decade, provided the population growth can be reached.

**ENERGY AND PROTEIN REQUIREMENTS - REPORT OF A JOINT FAO/WHO AD HOC EXPERT COMMITTEE, MARCH 22-APRIL 2, 1971 (FAO NUTRITION MEETINGS REPORT SERIES NO. 52: WHO TECHNICAL REPORT SERIES NO. 522)**

Food and Agriculture Organization of the United Nations
World Health Organization
1973, 118p.

Food and Agriculture of the United Nations
Rome, Italy

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The specific tasks of the Joint FAO/WHO Expert Committee were to (a) examine the characteristics and criteria of the reference man and reference woman; (b) review new data as a basis for revising estimates of requirements and recommended intakes for energy, protein, and essential amino acids; and (c) review the method of chemical scoring and other methods used in evaluating the nutritive value of proteins. The report discusses basic definitions and presents a glossary of terms and units. A background chapter describes energy protein interrelationships and the share of nutrients in the energy supply. An extensive chapter on energy considers physical activity, body size and composition, climate, energy requirements of reference adults, infants, children, and adolescents, energy requirements during pregnancy and lactation, and food energy in relation to other nutrients. A chapter on protein discusses requirements for nitrogen and amino acids, factors influencing protein requirements, the safe level of intake of egg or milk protein, and adjustments for the quality of protein in the diet. Practical applications are then discussed in terms of energy and protein needs at the national or population level. A final chapter deals with future research: the need for field data, ethical considerations, gross energy supplies, prediction of energy requirements, gross protein supplies, prediction of nitrogen and amino acid requirements, the significance of diets in pregnancy, lactation, and perinatal feeding, protein-energy interactions; and nutrition, infection, and pasasitism. One major conclusion in this report is that protein is used inefficiently if energy intake is grossly inadequate. The extent to which inadequacy of energy intake affects protein utilization, and the extent to which additional intakes of protein can be used to meet protein requirements in the presence of caloric inadequacy needs much further investigation. The role and effect of pre-existing energy stores (adipose tissue) on this relationship must be considered in studies of this phenomenon. Definition of a satisfactory protein/energy ratio would permit an approach to the appraisal of dietary quality that would find wide application and would resolve some of the difficulties referred to in this report.

**FOOD AND NUTRITION EDUCATION IN THE PRIMARY SCHOOL, A GUIDE FOR ITS INTRODUCTION (FAO NUTRITIONAL STUDIES NO. 25)**

Food and Agriculture Organization of the United Nations
1971, 107p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies in English, French, and Spanish may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The purpose of this booklet is to provide guidance for nutritionists, especially those concerned with presenting food and nutrition education in primary schools. This plainly written and heavily illustrated booklet discusses not only what should be taught in a primary-level nutrition education program but how the subject and related practical activities can be most effectively presented. The "learning-by-doing" approach advocated in this booklet and illustrated in its photos and drawings can perhaps best be inferred from its chapter and subchapter headings. The first chapter presents "Some principles governing education in general and food and nutrition education in particular." Subparts discuss the art of teaching; nutrition, production, purchasing power, and culture; the necessity of nutrition education; the art of teaching food and nutrition. The second four chapters presents an "introduction of food and nutrition education in the primary school." Subparts discuss preliminary stages; starting to teach; teaching theory in the classroom; practical teaching in the classroom; school feeding; and food and nutrition teaching at the community level. The third chapter, on "Teaching tools," discusses the plan of studies; training of teaching personnel; audiovisual aids; and nutrition manuals. The final chapter, on evaluation of results, discusses evaluation of the knowledge received, of habits, of physical change; other indices of evaluation; evaluation of the school garden, farm, and fishpond; evaluation of school feeding; and overall program evaluation. Appendices discuss the integration of food and nutrition subjects into the curriculum, and some food and nutrition manuals published in developing countries.

**VISUAL AIDS IN NUTRITION EDUCATION**

Holmes, A. C.
1968, 154p.

Food and Agriculture Organization of the United Nations
Rome, Italy

Free copies in English, French, and Spanish may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This manual is a practical guide to the selection and preparation of audio-visual aids for use in nutrition education programs. It is not intended as a textbook on nutrition or on the food and nutrition problems in developing countries. The user of the guide is assumed to have knowledge of the elements of nutrition and the methodology of food and nutrition education, and to be familiar with the food and nutrition problems in the locality in which he is conducting his educational program. Chapters of the booklet discuss and illustrate teaching with audiovisual aids; two-dimensional aids as reminders; two dimensional aids involving active participation by learners; three-dimensional aids; stories and plays; photos, pictures and films; radio, television, newspapers, and mass-media films; construction and use of equipment; drawing and coloring techniques; lettering techniques; choosing and evaluating visual aids; and training in the use of visual aids. In summarizing the contents of the booklet, the author warns that the cost or complexity of an aid is not measure of its value for teaching; many simple and inexpensive aids are just as effective as costly ones. The process of using aids

effectively involves finding out what has to be taught, deciding what aids will help, selecting or making them, testing them, discarding or altering ineffective ones, using the aids, evaluating their effectiveness, and then improving them.

### HEALTH EDUCATION OF THE TROPICAL MOTHER IN FEEDING HER YOUNG CHILD

Jelliffee, D. B.; Bennett, F. J.
1964, 26p.

U.S. Department of Health, Education and Welfare

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

Before the planning of any health education, it is imperative to have as much background information as possible. Areas of importance will include: 1) local methods of child feeding, 2) local patterns of malnutrition, 3) local patterns of childhood diseases, 4) locally available foods, 5) local culture pattern, 6) local home economics, and 7) local status and activity of women. The syndrome of protein-calorie malnutrition of early childhood are never exclusively of dietary etiology. An "ecological diagnosis" always is required and will vary from region to region, thus necessitating the modification of emphasis in health education to suit the particular area. For protein-calorie malnutrition, the following causes always must be considered: 1) dietary, 2) infective, 3) parasitic, and 4) psycho-social. Assuming adequate background information and a local ecological diagnosis, certain general principles will need consideration in the planning stage: felt-needs, range of topics, methods and media, evaluation, and two main tropical groups (privileged and under-privileged). All the above subjects are examined in this report.

### FOOD COMPOSITION TABLE FOR USE IN EAST ASIA

Leung, Woot-Tsuen Wu, Rauanheimo, R.; Huang Chang, Butrum and Flora
December 1972, 333p.

U.S. Department of Health, Education and Welfare
Nutrition Program, Center for Disease Control
Public Health Service
Atlanta, Georgia 30333

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A collection of most of the analytical data available on the nutrient content of foods in East Asia. A total of 1,629 items were selected for inclusion and classified into fourteen food groups: 1) cereals and grain products; 2) starchy roots, tubers, and fruits; 3) grain legumes and legume products; 4) nuts and seeds; 5) vegetables and vegetable products; 6) fruits; 7) sugars and syrups; 8) meat, poultry, and game; 9) eggs; 10) fish and shellfish; 11) milk and milk products; 12) oils and fats; 13) beverages; and 14) miscellaneous. They were analyzed for food energy, protein, carbohydrate, minerals, sodium and potassium vitamin A, ascorbic acid, and refuse. Data also are included on amino acids, fatty acids, trace elements, and certain B-vitamins. In compiling this Asian food table, it was noted that many indigenous foods, sometimes not wisely used, are not only rich in certain essential nutrients, but also practical and economical for menu planning consistent with local eating habits. Such foods should be advocated for greater daily use, and some would be valuable in formulating infant food and/or protein-supplements, as well as for determining agricultural production goals.

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

### FOOD COMPOSITION TABLE FOR USE IN AFRICA

Leung, Woot-Tsuen Wu; Busson, F.; and Jardin C.
1968, 306p.

U.S. Department of Health, Education and Welfare
Nutrition Program, Center for Disease Control
Public Health Service
Atlanta, Georgia 30333

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A collection of most of the analytical data available on the nutrient content of foods in Africa. There are many foods for which nutrient analyses have not been completed. However, this table can provide basic and useful data for the evaluation and improvement of diets consumed in Africa. Local foods which are found to be particularly rich in specific nutrients in which African diets are deficient can be brought to the attention of local people to encourage increased production. A total of 1,624 food items were selected to represent the most commonly used food items and are classified into fourteen food groups: 1) cereals and grain products; 2) starch roots, tubers, and fruits; 3) grain legumes and legume products; 4) nuts and seeds; 5) vegetables and vegetable products; 6) fruits; 7) sugars and syrups; 8) meats, poultry, and insects; 9) eggs; 10) fish and shellfish; 11) milk and milk products; 12) oils and fats; 13) beverages; and 14) miscellaneous. Each item is analyzed into moisture content, food energy protein, carbohydrate, minerals, vitamin A, tryptophan, ascorbic acid, and refuse.

### A SELECT BIBLIOGRAPHY OF EAST/ASIAN FOODS AND NUTRITION ARRANGED ACCORDING TO SUBJECT MATTER AND AREA

U.S. Department of Health, Education and Welfare; Food and Agriculture Organization of the United Nations
December 1972, 295p.

U.S. Department of Health, Education and Welfare
Nutrition Program, Center for Disease Control
Washington, D.C. 20201

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The main objective of this bibliography is to provide to its users, at a glance, the data now available on each subject matter in each specific area. Bibliographical references were selected and limited from the period between 1940, with few exceptions, to the time of this writing in 1972. This collection of references, which were scattered over such wide areas, are classified into nine basic food nutrition subjects of the region as a whole, as well as of 14 Asian areas. Basic foods and nutrition subjects are subclassified as: General information on Asican foods and nutrition; Food Resources; Food Composition, including food analysis; Food Supplement; Food Technology; Food Habits; Nutrition and Dietary Surveys; Nutritional Status, including nutritional deficiency diseases; and Nutritional Education. The 14 countries included are: Burma, Cambodia, Mainland China, Taiwan, Hong Kong, Indonesia, Japan, Korea, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

### A SELECTED BIBLIOGRAPHY ON AFRICAN FOODS AND NUTRITION ARRANGED ACCORDING TO SUBJECT MATTER AND AREA

U.S. Department of Health, Education and Welfare; Food and Agriculture Organization of the United Nations
December 1970, 382p.

U.S. Department of Health, Education and Welfare
Nutrition Program, Center for Disease Control
Washington, D.C. 20201

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

Listings in this bibliography are arranged by nine basic food and nutrition subjects for fifty-two areas. These subjects are subclassified as: General, Food Resources, Food Composition, Food Supplements, Food Technology, Food Habits, Nutrition and Dietary Surveys, Nutritional Status, and Nutritional Education. A map with countries or areas listed alphabetically by numbers is included. References cited here cover the period between 1940, with a few exceptions, and 1969.

### NUTRITION SURVEY ON INFANTS AND PRESCHOOL CHILDREN IN JORDAN, NOVEMBER 1962 - OCTOBER 1963 - THE HASHEMITE KINGDOM OF JORDAN

Department of Defense
June 1964, 180p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This report presents the findings and recommendations stemming from a nutritional survey of 2,843 children 0-5 years of age from the various regions of Jordan. The results show definite presence of malnutrition, as revealed in the weight and height patterns, the dietary pattern, low vitamin A and carotene levels, low riboflavin excretion, anemia, and the clinical cases of marasmus, prekwashiorkor, and kwashiorkor. The following recommendations are based on the findings: Iron and riboflavin should be added to the locally produced and imported flour. Supplementary vitamin A should be administered to infants, preschool children, and pregnant and lactating mothers. Vitamin A should be added to the vegetable ghee produced in Jordan, and the feasibility of adding vitamin A to olive oil should be studied. Skim milk used in infant feeding should be vitamin-A fortified as soon as this product becomes available. If feasible, it should also be fortified with vitamin D. Where feasible, powdered whole milk and vitamin A- and D-fortified skim milk should be distributed to needy children. Maternal and child health programs for the care of infants and children should be intensified and improved. Nutrition education should be introduced or intensified in all schools, especially girls' schools and home economics training programs. Standards for infant foods to be sold and distributed for use in Jordan should be examined by a properly qualified advisory committee to appraise the nutritive quality of the products and the claims for those marketed in the country.

### NUTRITION SURVEY, FEBRUARY-APRIL 1961 - REPUBLIC OF LEBANON

Department of Defense
May 1962, 205p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A nutrition survey of Lebanon was conducted by a team consisting of Lebanese, American, French, and United Nations personnel. They appraised the availability of food, food technology, dietary patterns, and the physical and biochemical status of representative samples of the military, civilian, and refugee segments of the national population. The purpose of the study was to assess the nutritional status of the country, train nutritional personnel, assist in establishing a nutrition laboratory, and provide advice concerning improvements in nutritional health. Some 8,600 individuals were examined in 34 locations, including 3,521 school-age children. Biochemical assessments of several nutrients in blood and urine were conducted with 614 subjects. The results indicated that the caloric intake of the average Lebanese adult is adequate. Average caloric intake ranged between 2800-3200 in the military, 2300 among civilians, and 2000 in the refugee group. The estimated mean daily deficit for the refugee group was 300 caloires, and evidence of severe malnutrition was common among young refugee children. A countrywide deficiency of iodine was found; over 45 percent of all persons examined had goiter. There was also a widespread deficiency of riboflavin. Intake of thiamine was acceptable. Iron deficiency was widespread, vitamin-A deficiency was widespread, and periodontal disease was common. Recommendations from the study included the following: All salt should be iodized. White flour should be enriched with riboflavin, iron, and thiamine. Infants and preschool children need to be better fed through special programs. Educational programs in nutrition, sanitation, and hygiene need to be initiated or expanded.

### A NUTRITION SURVEY OF THE ARMED FORCES OF PAKISTAN (REPRINT FROM THE JOURNAL OF NUTRITION, V. 68, S. 2)

Department of Defense
July 1959, 69p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A nutrition survey of Pakistani Armed Forces, conducted in 1956, included physical examinations of 2,019 soldiers, sailors, and airmen, dietary studies, and biochemical studies. Serious nutritional deficiency states were not found. The highest incidences of lesions traditionally associated with nutritional deficiencies were nasolabial seborrhea, follicular keratosis, acneform eruption, papillary hypertrophy, caries, gum recession with debris, and marginal gum swelling. Thyroid enlargement noted in one-third of the Azad Kashmir Forces examined suggests the possibility of an iodine deficiency. In general, the dietary intake of the Pakistan Armed Forces was found to be good, with sufficient protein, iron, thiamine, and niacin. Calorie intake was adequate. The dietary intake of riboflavin of the rice-eating troops in East Pakistan was slightly lower than that of the wheat-eating troops in the same area. Some units were receiving suboptimal amounts of vitamin C and vitamin A. Edible food wastage was found to be low (about 4%) in most Army units and somewhat greater (about 10%) in the Navy and Air Force. Biochemical studies of blood and urine from 496 Armed Forces members verified the generally satisfactory physical condition observed clinically. Levels of hemoglobin, hematocrit, serum protein, and serum vitamin A levels were satisfactory. Serum carotene levels were lower than in U.S. males, and serum ascorbic acid levels were critically low in a high percentage of the men. Thiamine, riboflavin, and N-methylnicotinamide were within the range associated with good nutrition.

**A NUTRITION SURVEY OF THE ARMED FORCES OF THE PHILIPPINES, SERUM TOTAL CHOLESTEROL VALUES IN MEN OF THE ARMED FORCES OF THE PHILIPPINES (REPRINT FROM THE AMERICAN JOURNAL OF MEDICINE, INC., NOV-DEC ISSUE, V. 7, N. 6 P. 657-710)**

Department of Defense
1959, 53p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The data presented in this paper were collected during a nutritional survey conducted in February and March of 1957. Because most of the military personnel examined were billeted with their families, the findings and implications reflect to a large extent the nutritional situation among the adult civilian population. The serum cholesterol levels of 351 enlisted men aged nineteen to fifty-eight, selected at random from the Armed Forces, varied from 73 to 274 mg. per 100 ml., with a mean of 169.7. The dietary survey showed that in the mess halls, fat supplied a mean of 13.9 percent of the total dietary calories, which averaged 3,068 per capita. Mean values indicated that the fat is contributed almost equally from animal and vegetable sources. The diet of 28 enlisted men taking their meals at home gave a mean of 16.9 percent of total calories supplied by fat. The low fat content of the diet may have a bearing on the relatively low serum cholesterol levels obtained in this study, compared to those reported for populations in the U.S. and northern Europe. Statistical study of the data of both the random and nonrandom groups showed significant increases of serum total cholesterol values with increases in age over the range of eighteen to fifty-eight years, and with increases in diastolic blood pressure, relative body weight, and serum carotene levels. No correlation was obtained between serum total cholesterol and systolic blood pressure, serum vitamin A, or hemoglobin levels.

**NUTRITION SURVEY, OCTOBER-DECEMBER 1960 - THE KINGDOM OF THAILAND**

Department of Defense
February 1962, 285p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A team of 60 Thai and 16 U.S. specialists conducted a nutrition and health survey of military and civilian populations in Thailand. For most nutrients, a reasonable degree of uniformity was found from area to area in both the military and civilian groups studied. The average caloric intake among the civilian population studied was 100 calories below the estimated average requirement of 1,871 calories. Because of the universal use of undermilled rice by the military services, thiamine nutrition in the military was satisfactory. However, the civilian populations evidenced considerable thiamine deficits. Studies on the role played by thiamine deficiency in the high mortality rate of infants and small children are urgently needed. The entire population evidences a deficit of riboflavin. Niacin nutrition seems adequate. Anemia is prevalent, and the multiplicity of etiologies in Thailand renders the problem very complex. Protein malnutrition seems to be limited to infants and small children, as does most vitamin-A malnutrition. Vitamin C nutrition presents few problems, but a modest increase of vitamin C is desirable in the military diet. Iodine malnutrition is widespread, and goiter is common. Fat intake is low, salt intake is high, and destructive peridontal disease is extremely prevalent, though dental caries are not. Major recommendations from the study include the following: The nutritional organizations and programs in Thailand should be better integrated and coordinated. Livestock production and distribution of meat products should be stimulated and improved. The fishing and canning industry should be greatly expanded. Citrus fruits should be added to military diets. The existing scientific manpower in Thailand should be directed toward expanded research and teaching programs.

**NUTRITION SURVEY OF THE ARMED FORCES - TURKEY**

Department of Defense
April 1958, 67p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washingtion, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A nutrition survey conducted during the period April through June, 1961, assessed the nutritional status of the troops, the military feeding services, related agricultural and social factors, and formed the basis for recommendations. The survey included clinical examinations of 8,519 soldiers, sailors, and airmen including 1,705 detailed examinations and biochemical analyses of blood and urine samples collected from 464 men. Seven dietary intake studies of two to four days' duration were completed in kitchens feeding a total of approximately 8,000 men per day. The men appeared to be in excellent condition and to be receiving adequate dietary intake, except for inadequate amounts of vitamin C, vitamin A, and riboflavin. In general, sanitation and public health were found to be adequate. Recommendations included the following: A permanent board or commission on nutrition of the Armed Forces should be established. Monthly master menus for the three services should be prepared. Emergency combat rations should be formulated and tested. Tables of basic nutrient minimum requirements should be prepared. Information on the chemical composition and nutritive value of Turkish foods should be assembled. To ensure adequate intakes of vitamin A, vitamin C, and riboflavin, margarine could be enriched with vitamin A, the issue of leafy green and yellow vegetables could be increased, vitamin C tablets could be considered for emergency combat conditions, a plant for preserving citrus fruit juices should be considered, the possibility of enriching flour with riboflavin should be explored, the military ration laws should be changed to include full consideration of vitamin intakes, and a program should be instituted to ensure improved methods of cooking.

**NUTRITION SURVEY OF THE ARMED FORCES - URUGUAY**

Department of Defense
May 1963, 294p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

Conclusions from the survey found that the average caloric intake was adequate or more than adequate in all areas studied,

as was the protein intake. The dietary intakes of vitamin A, carotene, and vitamin C generally were in the low to acceptable range, with some areas showing extremes in both directions. Clinical examinations revealed signs of mild rickets in infants and young children, owing a vitamin D deficiency. Niacin and riboflavin intakes mainly were in the acceptable range, while thiamine intake was lower. Iron and calcium intakes generally were adequate, though goiter (an iodine deficiency) was the most common physical abnormality seen. Uruguay has devoted considerably less effort to research related to agricultural production than would appear to be warranted in the light of its normal balance of trade. Lack of encouragement for the industrialization of agricultural commodities and the non-uniformities in the quality of exported products also are problems. Transportation, marketing, and inspection difficulties have led to disjointed supplies of foodstuffs, sometimes resulting in the low consumption of various nutrients. All of these problems are inherently correctable within the capabilities of the people of Uruguay.

### NUTRITION SURVEY OF THE ARMED FORCES - PERU

Department of Defense
December 1959, 181p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

Evaluation of food practices and analysis of food consumed. Randomly selected groups were examined and blood and urine specimens were obtained for laboratory analysis. Dental examinations were made, and electrocardiograms and stools for parasite examination also were taken. The most important clinical observations included relatively great body weight for height as assessed by North American standards and high prevalence of conjunctival thickening, nasolabial seborrhea, angular scars, and follicular hyperkeratosis. No overt nutritional deficiency disease was found. Acute diarrheal diseases are the chief cause of morbidity in this young military population. Dental examinations demonstrated relatively low caries incidence but a need for additional dental care. Biochemical findings demonstrated occurrence of anemia in one location at which intestinal parasitism puportedly is great. Serum ascorbic acid values indicated that sufficient intake is afforded at some military stations. Urinary excretion levels of thiamine were relatively low, warranting the opinion that diets do not always provide sufficient amounts of this nutrient. The average intakes of protein and of most vitamins were adequate, although there were marked variations among units for several of the vitamins. Observations indicate that improvements in sanitation, diet planning, and food preparation could contribute importantly to the health and readiness of these military groups. In addition to inadequacies of facilities for transportation, storage, and marketing, analysis of Peru's agricultural economy demonstrated problems of inequitable distribution of food because of large variations in climate and topography. Totally adequate data on food production are not available. A dietary standard to guide planning for food production is needed.

### NUTRITIONAL EVALUATION OF THE POPULATION OF CENTRAL AMERICA AND PANAMA - REGIONAL SUMMARY

Department of Defense
November 1971, 165p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

This report presents results and recommendations stemming from representative random sample surveys of the populations of Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama, conducted between 1965 and 1967. In total, 3,8000 families were examined at 190 locations in the six countries. A major recommendation based on the results of the study refers to government actions needed in all six countries. The governments need to define national priorities in terms of nutrition problems, groups to be reached, and methods to be used. They need to study and inventory their human resources for this task, select specific programs, define norms and targets, legislate food standards and control, increase the purchasing power of low socioeconomic groups, and establish a system for monitoring changes in food supply and in nutritional status. Short-term recommendations included the following: Salt should be iodized to eradicate endemic goiter. Sugar should be fortified with vitamin A to reduce this widespread deficiency. Iron should be distributed to pregnant women. Health service programs need to be greatly expanded, as do inservice training programs for physicians, nurses, and schoolteachers. Local production of corn, rice, beans, and small animals should be increased to raise the low caloric and protein intake of low-income groups. School lunch programs should be expanded to reach more children. Very young children should be given first priority on milk supplies. Obstacles to the wider use of incaparina should be studied and overcome. Several long-term recommendations deal with nutrition education, increases in nutrition specialists, improved genetic varieties of cereals, increased milk production, and improved hospital diets.

### NUTRITION SURVEY OF THE ARMED FORCES AND CIVILIANS - LIBYA

Department of Defense
December 1957, 76p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A nutrition survey made under the auspices of the Interdepartmental Committee on Nutrition for National Defense was conducted during the period June through August, 1957. Its objectives were to assess the nutritional status of the Armed Forces and selected civilian groups, to define their nutritional problems, and to assist in training personnel for nutrition programs for Libya. Of the 3,828 persons examined clinically in the field, 1,185 were Army troops, 1,014 were Defense Forces and Police, and 1,629 were civilians. The physical examinations of Libyan Army troops indicated that their nutritional status was satisfactory, but biochemical data and food intake studies showed that their nutritional reserves were borderline. The status of the Provincial Police and Defense Forces was less satisfactory than that of the Army, as was the status of the civilian groups who volunteered to be studied. Among the civilians, numerous hospitalized infants and children were seriously ill from malnutrition. Among infants examined outside of hospi-

tals, more than 30 percent had clinical evidence of rickets, and many were grossly undernourished. Anemia was common among the women, especially pregnant women. The nutritional status of civilian men was less satisfactory than that of the Armed Forces, but considerably better than that of the women and children. The following recommendations were among those made in the report: that the Development Council appoint a National Advisory Committee on Nutrition; that periodic nutrition surveys be taken; that the Armed Forces establish an Advisory Committee on Military Nutrition and Food Service; that the Ministry of Education institute a program of recording the age, height and weight of school children each year; that the already substantial child feeding and school lunch program be continued; that the sizable effort now being put into developing fruit production in Libya be further expanded; that the possibility of the economic production of tea in the Gebel be investigated as a means of decreasing the 10 percent of foreign exchange expenditures now spent for tea; and that import-export policies pertaining to food be formulated with consideration given to nutritional values.

**NUTRITION SURVEY - FEDERATION OF MALAYA, SEPTEMBER-OCTOBER 1962**

Department of Defense
September 1964, 355p.

Interdepartmental Committee on Nutrition for
National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20301

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A team of U.S. and Malayan physicians, dentists, nutritionists, chemists, and parasitologists evaluated the nutritional status of military and civilian populations throughout Malaya. Of the 8,172 examinations conducted, 1,569 were detailed physical exams and 729 were detailed chemical exams. Detailed dietary histories were also conducted, samples of fresh and cooked food were analyzed, and food and agricultural facilities were evaluated. The report factually evaluates the state of physical health of adults, the growth and development of children, and the incidences of such diseases as hypertensive vascular disease, obesity, and diabetes. The state of nutrition is also evaluated in terms of specific chemical components and vitamins and minerals. Among the conclusions and recommendations of the report: Anemia was found in 36 percent of children under age five, in 13 percent of children aged 5-14, and in 19 percent of all nonpregnant women over age 15. Protein nutrition seemed to be quite adequate for all groups except children under age five. Protein malnutrition was particularly evident in rural areas. Although goiter was not present in alarming quantities, iodine excretion values were low; the government should require the addition of iodine to salt. The rates of thiamine and riboflavin in children under age five are low; the government should undertake educational programs to warn against use of excess water in cooking rice, and also excess milling of rice. The government should also consider the use of vitamin-enriched rice, particularly in institutions and in the Army. The use of enriched wheat flour should also be explored. Levels of pyridoxine, niacin, ascorbic acid, vitamin A, carotene, vitamin D, and calcium were found adequate. Dental care programs need to be improved, and many rural communities lack potable water supplies.

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

**NUTRITION SURVEY OF THE ARMED FORCES - THE WEST INDIES (TRINIDAD AND TOBAGO, ST. LUCIA, ST. CHRISTOPHER, NEVIS AND ANGUILLA)**

Department of Defense
June 1962, 187p.

Interdepartmental Committee on Nutrition for
National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A sampling survey of the nutritional status of populations of the Eastern Caribbean islands was conducted by ICNND personnel and personnel recruited from Trinidad and Tobago. The survey, conducted in August and September, 1961, included a total of 7,504 individuals, including 1,652 families randomly selected from census data, 298 police in Trinidad, and 152 orphans in Trinidad. The abbreviated physical exams revealed a high incidence of nasolabial seborrhea, scars at the angles of the lips, enlargement of the thyroid gland, and loss of ankle jerks. Those are possible indications of, respectively, inadequate dietary intake of riboflavin, B-complex vitamins, iodine, and thiamine. The detailed physical exams revealed, in addition to the above, a high incidence of filiform papillary atrophy of the tongue and a moderately high incidence of parotid gland enlargement. Both are regarded as possible indications of dietary inadequacy of B-complex vitamins. The detailed exams also revealed a high incidence of recent parasitic and respiratory diseases and of streptococcal infections. The incidence of dental caries was high in all the islands surveyed. The fluoride content of all water supplies tested was extremely low. Periodontal disease was present to a high degree in large numbers of age and ethnic groups. Biochemical studies revealed a high incidence of low hemoglobin, probably due to low dietary iron intakes and the prevalence of hookworm disease. Ascorbic acid concentrations in plasma were adequate, as were carotene concentrations, but vitamin A concentrations were rather low. Thiamine and riboflavin metabolism were adequate. Caloric intakes were only slightly below WHO-recommended standards. Agriculture throughout the islands suffers from too little emphasis on high-nutrient food crops and over-emphasis on production of cash crops with little direct food value. Animal husbandry and fishing are not extensively developed, partly because of inadequate transportation and marketing facilities. Recommendations concerning short-term action included the following: School feeding programs should be evaluated and improved. The distribution of milk to preschool children through health centers needs to be improved. Nutrition education programs should be improved. Inservice training programs in maternal and child health need to be improved and expanded. Public education programs in personal hygiene and dental health should be greatly expanded. More iron needs to be added to dietary intakes, either through iron tablets or fortification of flour or bread. The governments should ensure that all imported flour is enriched with thiamine, riboflavin, iron, and calcium. All salt imported to the islands should be iodized. The need for enrichment of rice should be investigated. All water supplies should be fluorinated. Each island should develop an integrated nutrition program. Long-term recommendations concerned the continued training of nutrition personnel, encouragement of production of more nutritional crops, expansion of livestock and fishing industries, development of marketing and distribution systems, and regional cooperation of the governments with each other and with international development agencies.

## PUBLIC HEALTH

### NUTRITION SURVEY OF THE ARMED FORCES - SPAIN

Department of Defense
November 1958, 106p.

Interdepartmental Committee on Nutrition for
National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

A team of U.S. and Spanish medical specialists surveyed the nutrition status of 10,727 members of the Spanish Army, Navy, and Air Force during the period April through June, 1958, in ten locations throughout the country, of the total men examined, 2,145 were examined in detail, and 520 had blood and urine samples taken for biochemical analysis. The main clinical findings indicate relatively high rates of angular lesions of the lips, cheilosis, lesions of the gums, and follicular keratosis. The findings were more marked in members of the Army than of the other services. Men of rural origin evidence a higher incidence of almost all clinical findings than men from the cities and towns. A high incidence of dental flourosis was also found. Among the biochemical findings, the levels of serum protein, hemoglobin, serum vitamin A, and serum carotene were acceptable. About one-fourth of the serum vitamin C levels and of the urinary thiamine excretion values were low. Although the urinary excretion value of riboflavin was high, the red cell riboflavin levels were below those found in the U.S. The serum cholesterol values were appreciably lower than reported for populations consuming relatively high fat diets. Caloric intakes were found to be satisfactory for the level of physical activity, as were intakes of fat, which averaged 80 grams daily. The survey findings indicate that, in general, the nutritional status of the Armed Forces of Spain is satisfactory.

### NUTRITION SURVEY, OCTOBER-DECEMBER 1961 - UNION OF BURMA

Department of Defense
May 1963, 287p.

Interdepartmental Committee on Nutrition for
National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

By invitation of the government of Burma, a nine-man team of U.S. investigators conducted a nutrition survey of the Armed Forces and their dependents during the period October through December, 1961. More than 9,000 soldiers, dependents, and other civilians were physically examined; 2,579 were given detailed physicals, 725 received detailed biochemical examinations; and 4,430 were given dental examinations. There was no evidence in the clinical, dietary, or biochemical findings of protein deficiency. However, the dietary intakes of riboflavin were borderline, and clinical lesions generally associated with a deficiency of this vitamin were prevalent. Intake of niacin and its equivalents appeared to be adequate, but dietary intake of vitamin A was low. Intake of vitamin C was adequate. The incidence of dental caries was low in all groups. Recommendations included the following: Adopt a standard program of enriching rice with 2.4 mg riboflavin, 4.4 mg thiamine, 38.25 mg niacin, and 28.69 mg iron. Enrich canned sweetened condensed milk with vitamins A and D, thiamine, and riboflavin. Require that all salt purchased for the military contain added iodine in the form of 1.686 grams of potassium iodate per 10,000 grams salt. Consolidate kitchens and mess halls to reduce the amount of burned or charred rice. Eliminate use of excess water in cooking rice, since when it is poured off it eliminates up to one-half the thiamine content of the rice. Radically improve Army hospital diets. Radically improve Army sanitary facilities. Develop refrigeration facilities for fresh foods at each supply depot, and develop rodent and pest control procedures. Establish a training school for military cooks and kitchen aides. Modify the present ration system for married military men, and establish military-controlled commissaries. Establish a strong nutrition educational program for military dependents. For civilians establish nutrition education programs. Form a National Nutrition Council. Encourage and support diversification of the diet, to include particularly foods that would help remove the riboflavin deficiency in the diet. Expand the fishing, canning, and livestock industry.

### NUTRITION SURVEY OF THE ARMED FORCES, SEPTEMBER-OCTOBER 1960 - REPUBLIC OF CHINA

Department of the Defense
December 1961, 79p.

Interdepartmental Committee on Nutrition for
National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

In September and October of 1960 a combined Chinese and American team surveyed the state of nutrition of the Armed Forces of the Republic of China. The purpose of the survey was to determine the nutritional status of soldiers, sailors, and airmen on Taiwan, Penghu, and Kinmen; to evaluate the effectiveness of a program of rice enrichment instituted in 1958; and to offer advice on military nutrition. Four thousand members of the armed forces were examined clinically. Blood and urine samples from more than 300 of them were analyzed biochemically. Ten military messes were surveyed, dietary composites were collected, and the intakes of nutrients were measured chemically. Surveys were conducted of food availability and food processing facilities, with special attention to the program for vitamin enrichment of rice for the Amred Forces. The average intakes of most nutrients in the military messes were satisfactory. Although animal protein consumption was low, the intakes of essential amino acids were adequate. The intake of vitamin A was low by ICNND standards; intake of vitamin C and thiamine was acceptable; intake of riboflavin and all other nutrients was high, due largely to the enrichment program. More meat, fish, and vegetables were being consumed than in 1954. The clinical examination showed the men to be in excellent condition, though some had mild inflammation of the gums. Since most of these men were new recruits, it was concluded that the nutritional status of the armed forces was better than that of civilians. Recommendations were that the rice enrichment program be continued, with no change in the enrichment formula; that a more comprehensive program be set up to control the enrichment process; that consumption of yellow-green leafy vegetables be increased; that the nutrition survey work be continued; and that military authorities undertake closer cooperation with civilian groups in the province of Taiwan who are involved in nutrition and food processing.

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

### NUTRITION SURVEY, MAY-JUNE, 1963 - VENEZUELA

Department of Defense
June 1964, 407p.

Interdepartmental Committee on Nutrition for National Defense
Office of the Assistant Secretary of Defense
Department of Defense, Washington, D.C. 20523

Free copies may be obtained from: Agency for International Development, Office of Nutrition, Technical Assistance Bureau, Washington, D.C. 20523

The nutrition survey was made up of four major phases: 1) A study of agricultural production, food technology, and food distribution. 2) Clinical examinations of representative samples of the branches of service in the military population and of the predominantly urban, lower economic classes of civilians believed to be representative of six major areas of the country. 3) A dietary survey of the actual food intake of a representative sample of the military and civilian population examined. 4) Laboratory analysis of blood, urine, and food samples from the populations and studies mentioned above for chemical constituents associated with various aspects of human nutrition. It was found that those areas of Venezuela studied do have nutrition problems. They do not result primarily from an inability of the land to provide food for its people. Rather, sub-optimal agricultural and food technology practice, difficulties in food distributions, socio-economic factors, a tremendous population explosion resulting from the erradication of malaria and many diarrheal disorders, and lack of education combine to produce a subacute to chronic problem quite within the capabilities of Venezuela to correct.

## SCIENCE AND TECHNOLOGY

### INDUSTRIAL DEVELOPMENT

#### EMPLOYMENT GENERATION THROUGH STIMULATION OF SMALL INDUSTRIES

Frffe, D. E.
1973, 19p.

Georgia Institute of Technology
School of Industrial and Systems Engineering
Atlanta, Georgia 30332

This document describes a proposed educational program for a Master of Science degree for students interested in industrialization of developing countries, particularly the generation of employment through creation and development of small industries. The prerequisites for entering students are a bachelor's degree from a recognized institution, preferably with a major in engineering, sciences, or management. The recommended courses for the proposed program include Feasibility Analysis, Financial Concepts, Accounting, several Economics courses, Manufacturing Engineering, Facilities Design and Layout, Process Design, Facilities Management, Basic Organizational Concepts, Industrial Psychology, Controlling and Evaluating Personnel, Designing and Evaluating Man-Machine Systems, Manufacturing Management (several courses), Production Planning, Marketing Management, and several courses on the management of improvement and innovation: Sociological Concepts, Business Concepts, Technological Forecasting, Feedback Dynamics, Managing Technical Change, and others. Courses in natural resources include Land Development, Techniques in Land Planning, Environmental Control and City Planning, and others. Courses in the development function include Economic Development, Industrial Development, Research methods, International Marketing, and Case History Studies of Innovation in Developing Countries. In addition to course work, the curriculum proposes a project activity intended to provide the student with a guided experience related to creation and development of small-scale enterprises. The document does not indicate whether this proposed program was initiated at the Georgia Institute of Technology.
PN-AAC-613 $2.00

#### KENAF FOR PAPER PULP IN THE LOWER MEKONG BASIN, A PRE-FEASIBILITY STUDY (SUMMARY OF THE REPORT)

Atchison (Joseph E.) Consultants, Inc., New York; Agri-Business Consultants, New York
1976, 157p.

Agency for International Development
RED/Bangkok, Washington, D.C. 20523

Complete Report, 650 p.: PN-AAC-660 $54.75

This study was financed by the Regional Economic Development Office of U.S. AID in Bangkok and includes a literature review of about 200 articles on kenaf for pulp and paper. The agro-economic sections of the report include a plan for supplying kenaf whole stalk and bast ribbon to a mill in the Mekong Basin. Also included are estimates of the costs of the fibrous raw materials. Future agro-economic studies of kenaf *(Hibiscus sabsariffa* and *Hibiscus cannabinus)* for paper pulp are outlined. Out of six primary sites in the four countries in the Lower Mekong Basin, two in Northeastern Thailand show commercial possibilities. An analysis of pulp markets, raw material costs, manufacturing costs, and capital investment requirements indicates that a kenaf bleached soda or sulfate market pulp mill would be economically viable and beneficial to the nation. A recommendation is made that full-scale experimental production of kenaf pulps be undertaken in existing bagasse mills to assure prior market acceptance before a mill is built. Also discussed are additional possibilities for using kenaf for production of newsprint and composition panel boards.
PN-AAC-659 $13.00

#### THE INDUSTRIAL RESEARCH INSTITUTE IN A DEVELOPING COUNTRY, A COMPARATIVE ANALYSIS

Blackledge, J. P.
1975, 262p.

Denver Research Institute
University of Denver
Denver, Colorado 80210

To assess the effectiveness of industrial research institutes in the developing countries, the world body of literature was reviewed and many such institutes were visited. In general, the institutes are not nearly as effective as they could be. Their main purpose is to stimulate and assist development and growth of private and public industrial enterprises in their countries. The chief reason why most such institutes are not performing this function very well is a lack of communications and interactions between the institutes, industries, the development banks, and government units. There is need for much more exchanges of views among these entities concerning their needs, capabilities, problems, priorities, etc. Industry, government, and development banks need to development mechanisms for maintaing a two-way flow of people, so that they can better understand the institute's potential for contributing to industrial growth and economic development. Institutes must acquire or train staff members who are experienced and interested in industrial problem-solving, and who are willing to go into the industrial environment to seek problems, learn about industry's planning, and relate these to the capabilities of the institute staff. Progress in solving these problems is being made at many of the institutes. However, the mechanism of using expert consultants who provide advice and

counsel to institute directors is often not effective. The experts make a brief visit, offer advice, leave, and do not make follow-up visits to assist in the process of implementation. In all to many countries, industry is apparently not interested in using the services of research institutes. However, if institutes will follow the approach used by the Singapore Institute of Standards and Industrial Research (SISIR), such industrial reluctance can be overcome. That approach involves pursuing a course of aggressive and frequent industrial contacts, and providing services consonant wih industry's needs. Formal linkages between advanced-country and developing-country institutes, established around specific programs and training activities conducted for several years, are most important aids to improving industrial research institutes in developing countries.
PN-AAC-725 $21.75

SOCIAL SCIENCE

## GENERAL SOCIAL SCIENCE

### INTRA-CULTURAL VARIABILITY IN THE STRUCTURE OF THE SUBJECTIVE COLOR LEXICON IN BUGANDA

Pollnac, R. B.
1975, 21p.

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

(In American Ethnologist, v. 2, no. 1, p. 89-109)

A description of the relationship between variability in the structure of the Luganda color lexicon and other socio-cultural variables. The description of color in the physical and socio-cultural environmental in Buganda is described first in order to provide a context for the description of the color lexicon. Several psycholinguistic techniques are used to determine the range and extent of cognitive variability with respect to the color lexicon, and this variability is related systematically to other sociocultural variables. The general methodological approach used to determine the range and extent of intracultural variation in the cognition of the several color terms was to administer, in Luganda, several psycholinguistic instruments to a representative sample of rural and peri-urban Baganda. The psycholinguistic techniques used were the triad sort and the sematic differential. In sum, the covergence of results from the various techniques gives one quite a bit of confidence in the validity of the finding that there is intracultural variability in the structure of the subjective color lexicon among Baganda. The interpretable relationships between the lexical structures and other sociocultural variables indicates that the methodology used here can be a useful compliment to the more traditional approaches in the analysis of changing social systems.
PN-AAC-194 $2.00

## DEVELOPMENT PLANNING

### COMPARATIVE AGRICULTURAL POLICIES IN POST-INDEPENDENCE EAST AFRICA

Seidman, Ann
1970, 53p.

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

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

An outline of the approaches taken by the governments of Kenya and Tanzania during the 1960s to increase agricultural output and change the institutional structure of the agricultural sector established before the countries became independent nations. Upon obtaining independence, both countries succeeded in involving African peasants in increased cash crop production, especially for export, and both nations confronted problems of falling world prices for their major export crops. In Kenya, about a fifth of the highlands was turned over to relatively small farmers, another fifth to large private African farm owners, and other lands were consolidated into holdings in the former "reserve" areas. While overall agricultural output did improve, the policy produced large numbers of landless peasants who had little choice but to work for large farmers for relatively low wages, or to drift into the city slums. The Tanzanian government and TANU, noting those effects of an initial policy, sought to avoid the growth of a society of "haves" defending the status quo against the "have nots" by stimulating the organization of ujamaa villages on a broad front throughout the country. Whether Tanzania's policies will be successful seems to depend partly on whether the government and TANU can build the necessary political and economic institutional framework involving the peasants.
PN-AAB-905 $4.40

### COMILLA RURAL DEVELOPMENT PROGRAMS; RESULTS FROM EAST PAKISTAN FOR INTERNATIONAL TESTING

Stevens, R. D.
1971, 59p.

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

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

The Comilla District program was begun in 1961 by the Pakistan Academy for Rural Development to provide training and to stimulate development of organizational resources for establishing agricultural cooperatives, irrigation programs, women's education programs, and rural public works programs. Two major programs discussed in detail by the author are the Thana (county) Training and Development Center and the Agricultural Cooperatives program. The Training and Development Center played a crucial role in developing a rural works program which created an average of 40 million man-days of employment annually. The work produced a major increase in infrastructure facilities in rural areas. Without the Thana-level organization and training, the works program would have failed completely or provided a much lower return. Similarly, the Thana Irrigation Program, which was initiated on a province-wide basis in 1968-69, had by 1971 placed 26,000 operating pumps in the field. These were able to irrigate 1.3 million acres. By comparison, the East Pakistan water agency had been able to irrigate only 94,563 acres in 20 years and at great cost, and a nine-year effort by the Agricultural Development Corporation had fielded only 3,900 pumps. Over a period of years, the Agricultural Cooperative Program has financially benefited small farmers by providing low interest loans, training programs, and technical assistance. Strong evidence that the Comilla Cooperative system held promise for all of East Pakistan came from approval in 1970 of its Integrated Rural Development Program by the central government of Pakistan.
PN-AAB-906 $4.90

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

### LOCAL INITIATIVE IN YEMEN; EXPLORATORY STUDIES OF FOUR DEVELOPMENT ASSOCIATIONS

Green, J. W.
1975, 83p.

Sector Project & Planning Division
Office of Technical Support Bureau for the Near East
Agency for International Development
Washington, D.C. 20523

The objectives of this study were to (1) survey tribal organization and the operation of local development associations; (2) explore the Yemeni national commitment to local self-help development efforts; (3) gather information on local socioeconomic conditions and tribal organizations; (4) consult with other donors concerning related development efforts; and (5) advise and assist USAID and Yemeni officials in the development of a project design, if the study should show that a rural development project seemed feasible. Four local development associations (LDAs) in northern Yemen, in the Sanaa Governorate, were chosen for study: Al-Hiamahtain, Aines, Bany Hoshysh, and Khamer. Each was approached as a separate case in a study of its historical development, organizational structure, development responsibilities, functions, problems, relationships with its area constituency, the villages and villagers, and to the central government and other entities outside its area. Information was gathered through extensive conversations with members of the governing body and with villagers, and through physical inspections of the development projects. The studies showed that the LDAs are the organized forces for development in their respective areas. They are conducting effective if not always efficient development work in cooperation with their villages, and their potential can be further realized and complemented by outside rural development agencies. The highest priority of the villagers in the four areas studied (Yemen has 61 other legally recognized LDAs) is to obtain a nearby source of water for drinking. Well-digging of adequate roads is also a high priority. Equally important is the need for financing the construction of school buildings. Clinics are a fourth priority, followed by the need to increase resources for improving agricultural production. The author recommends that USAID participate in a rural development project in north-central Yemen, provided that USAID and the Yemeni government make a firm long-term commitment to supplement the development efforts of selected LDAs in ways consistent with the rationale and directions of the LDA movement, and provided sufficient resources are commited to help the selected LDAs achieve the development aims of their constituent villages. Further recommendations concern LDA area selection criteria, and staff and role assignments of U.S. and Yemeni rural development personnel.
PN-AAB-953 $6.90

### RURAL DEVELOPMENT AGENCIES AS DECISION MAKERS

Brown, D. W.
1968, 16p.

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

The problem of choice which confront rural development agencies in working out the broader aspects of program content and approach as well as their implementation, suggest various actions that social scientists of all kinds could take to help officials and technicians make more effective decisions. In exploring these problems, the following topics are considered: change-agency decisions as resource allocation, making program choices, operational steps for evaluating program alternatives, clarifying and weighing program objectives, the importance of considering human responses, some complicating realities, and putting plans into action. It was found that more research is needed to determine the success or failure of rural development programs already undertaken, and a study of ways for professional advisors, planners, and researchers to be of more effective help to action programs would be very worthwhile. There also needs to be better communication of research findings and simplifcation of decision-making concepts for use by the research development staff, and national planners and policymakers must perceive more clearly the realities of program design at operational levels.
PN-AAB-956 $2.00

### SOME PROBLEMS IN THE ANALYSIS OF URBAN PROLETARIAN POLITICS IN THE THIRD WORLD

Berg, Elliot
1976, 19p.

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

(In Discussion paper no. 48)

This paper assesses the link hypothesized by Marx and his followers between capitalist economic development and the emergence of a sizable and politically progressive urban proletariat capable of mobilization for revolutionary change. It pays special attention to issues of definition (who is the proletariat?) and to explication of the mechanisms linking economic development, industrialization, and radicalization of the proletariat, discussing the extent to which these mechanisms are operative in mature capitalists societies and Third World countries today. This study is a development of remarks made at a panel discussion of urban proletarian politics during the 1972 meetings of the American Political Science Association.
PN-AAC-126 $2.00

### EDUCATION, COMMUNALISM, AND INCOME DISTRIBUTION

Von der Mehden, F. R.
1976, 36p.

Program of Development Studies
Rice University
Houston, Texas 77001

(In Program of development studies. Paper no. 71)

An assessment of the impact of government policies on the distribution of income among communal groups. After evaluating the considerable importance of traditional attitudes and colonial policies, the paper analyzes the impact of post-independence official activities. Four fundamental policies are discussed in turn: 1) It is noted that various less-developed countries' governments have developed regulations either to restrict entrance into educational institutions or to provide "affirmative action" programs to aid disadvantaged groups; 2) The establishment of national languages can aid or inhibit groups depending upon this addition to employ the *lingua franca;* 3) Spatial distrotion leads to improve educational opportunities to those near modern centers in which Western learning is more available; 4) While efforts are being made to equalize educational expenditures, both past patterns and present programs mean that equal opportunities will demand more than equal attention to disadvantaged groups.
PN-AAC-167 $3.00

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

### SOCIAL FACTORS IN RESERVOIR-SETTLEMENTS AND AN ADAPTATION OF SCALOGRAM ANALYSIS WITH APPLICATION TO THE MEKONG BASIN PA MONG DAM PROJECT

Voelkner, H. E.; Schwartz, C. M.; Oliveri, W. B.
1972, 136p.

Agency for International Development
Washington, D.C. 20523

This study constructs measures of the degree of institutional complexity in the various village communities of the Pa Mong Reservoir area and then maps them so that the regions and sub-regions show up. It emphasizes the institutional complexity of communities, thus the different levels of development of these communities. Specifically, the objectives were: 1) To apply scalogram analysis (the comparison of certain village structural characteristics with a theoretical model so as to depict the structural development levels of villages and intervillage social systems for the area under study). The theoretical framework used is structural-symbolic theory which claims that the evidence of social life is social symbols. 2) To demonstrate the feasibility of using aerial photography data to derive data for scalogram analysis. 3) To estimate the extent of population and settlements displaced by the Pa Mong Reservoir at both 250 and 230 meters above sea level. Two general conclusions were reached. 1) That the concept of relocation of communities within a regional context be applied to reservoir-displaced populations, and 2) That there are new ways of analyzing data which previously have been considered unusuable for statistical programming and analysis.
PN-AAC-248 $11.30

### MANPOWER AND EMPLOYMENT DEVELOPMENT FOR ECONOMIC GROWTH AND SOCIAL JUSTICE

(James E. Hendricks, Keith V. Schroeder, Curtis C. Hall, Mildred E. Olsen, and W. Scott Boyd
1975, 318p.

Agency for International Development
Office of Labor Affairs
Washington, D.C. 20523

Copies in English or Spanish available at no cost from the Office of Labor Affairs, Agency for International Development, Room 103 SA-8 Washington, D.C. 20523

This is a technical manual, designed for the use of developing country officials and for United States development officials and technicians who have a need for information on how manpower and employment programs can function as an integral part of a total development effort, with the objective of achieving an expansion of employment opportunities, enhancing the well-being of working men and women, improving the level of living of the general population and especially the poor, and economic growth of the economy. It is hoped that this manual will be useful to all development officials as well as those specializing in manpower and employment functions. The manual presents a system for developing goals, programs, administration and program evaluation based upon a careful identification and analysis of social, economic and administrative problems that may exist in the country. A careful application of the system should be of considerable assistance in developing increasingly effective programs. The materials emphasize the fact that the development and execution of manpower and employment programs can be successful only if they are an integral part of an overall development planning and program execution process. Ways in which manpower and employment programs can be made an integral part of the development planning process are suggested in Chapter VIII.
PN-AAB-189 in English $26.40
PN-AAC-273 in Spanish $26.40

### IDENTIFYING, DEVELOPING, AND ADOPTING TECHNOLOGIES APPROPRIATE FOR RURAL DEVELOPMENT WITH APPLICATIONS TO HUARI PROVINCE IN PERU

Lund, M.A.
1975, 225p.

Iowa State University
Department of Economics
Ames, Iowa 50010

Dissertation—Iowa

The purpose of this study was to develop a conceptual analysis for the identification, development, and adoption of technologies appropriate for rural development that benefits the rural poor in less economically developed nations. Rural development is defined as a process by which the rural poor are assisted in improving their levels of output and living, on a self-sustaining basis, through their mass participation in the development process. The conceptual analysis was based on and can be applied to the selected case study area of twenty Andean communities in the Province of Huari in Peru. Investigated were the rationale for using technologies to stimulate rural development, the rationale for helping the rural poor, and the role of technology in rural development. The discussion of selection of appropriate technologies stresses physical, economic, and social-political criteria. If the rural poor are to benefit from new technologies in rural areas, the technologies need to be non-capital-intensive. An analysis of the case study area is focused on the rural development program of the Lutheran World Federation—World Service Department in Huari, Peru, where the rural poor have per capita incomes of about $100 and low levels of output. Recommended is the development of a research-training-service center in Huari, where rural poor, working with scientists, could jointly develop appropriate technologies which meet the physical, economic, and social-political conditions of the local area.
PN-AAC-317 $18.70

### THE POLITICS OF NATIONAL PLANNING, THE CASE OF ZAIRE

Rideout, W. M.
1974, 36p.

Florida State University
College of Education
Center for Educational Technology
Tallahasee, Florida 32306

(Prepared for the Annual Conference of the International Society of Educational Planners, Toronto, 1974)

Since Zaire's adoption of the policy of authenticity, the structure of the universities has been changed completely, the institutions have been nationalized, the students have been co-opted into either a supportive or neutralized position, the university faculty and administration have cooperated with the new organization, and the churches largely have been moved out of post-secondary education. A major justification for applying this policy to education has been the demand for economy in education — for cost effectiveness in the system. Too, since the government now controls the entire country, demonstrating its presence through the one-party political apparatus, army, police, and bureaucracy, the school ceases to be the unique or most significant representative of the government. The educational structure now is being considered in more natural, normal, national context. Education must not take a disproportionate share of the national budget, it must serve national socialization purposes, its student output must justify the funds invested in human resources development, and it must be subordinate to overall national needs. It would appear certain that authenticity will continue to be a

cornerstone of governmental policy for the foreseeable future and that it inevitably will have a profound impact on the educational system.
PN-AAC-494 $3.00

## LAND TENURE

### LAND REFORM, LAND-USE CHANGES, AND CAPITAL GAINS: THE PHILIPPINE CASE

Harkin, D. A.
1976, 11p.

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

(In Land Tenure Center paper no. 108) Copies available from above address, 75 cents in United States, Canada and W. Europe, free to other countries.

The advanced development of the economies of most of the western nations, in which private landownership generally has been a prominent characteristic, appears to stand as strong evidence in favor of freehold titles. The delegation of the myriad decisions concerning land use to the private sector appears to have been notably efficient. However, the role of private landownership in economic development must be evaluated with regard to both the technical complexity of advanced economies and the intensity of land use (which is related to population density). As these two factors increase through time, the various kinds of friction which result from largely unfettered private property right in land become more serious and less acceptable. For example, the amount of highway and other kinds of traffic increase with the technical complexity and division of labor in the economy. As a result, the kinds and arrangement of land uses which affect the flow of traffic become much more important than in the simpler, purely agrarian economy. As another example, as population density increases, the form of housing and method of sewerage disposal become greater concerns for public health. As another result, the landowner is restricted in the kind of housing he may build. The efficacy of unrestricted private property rights in land in economic development is not constant through time. Since the undesirable side effects increase with population density, it may be appropriate to ask whether in a nation with population density of the Philippines, a substantial departure from freehold title may be warranted. The limited title provided to the land reform beneficiary constitutes the beginning of such an institutional change that well might be extended to other problem areas.
PN-AAC-172 $2.00

### PHILIPPINE AGRARIAN REFORM IN THE PERSPECTIVE OF THREE YEARS OF MARTIAL LAW

Harkin, D. A.
1976, 33p.

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(In LTC research paper no. 68) Copies available from above address, $1. in the United States, Canada, and W. Europe, free to other countries.

A perspective of agricultural development and agrarian reform in the Philippines. It is not intended to summarize the research pertaining to the agrarian reform, and only presents such data as seem necessary to illustrate and substantiate the perspective. The first section of this paper shows the distribution of landownership and tenancy by size class and presents a socio-economic profile of tenants and small landlords. The next section is aimed at a broad interpretation of the nature of the tenure problem, viewing the institution of private property in land as the result of a social evolutionary process. If the problems of tenancy must be expected to arise again because of continuing population pressures on the land, it is important to assess what the current land reform can be expected to accomplish and what negative side effects there may be. These impacts are discussed here in regard to production distribution of income and wealth, labor absorption, and social changes. Following this are sections on the relation of land reform to population-resource issues, the relation of population-resource balance to development, future of agrarian reform, and the agrarian reform institute.
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### LAND TENURE AND AGRARIAN REFORM IN MEXICO, A BIBLIOGRAPHY (SUPPLEMENT)

Wisconsin University, Land Tenure Center Library
1976, 69p.

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(In Training and methods series, no. 10, supplement 2). Main work and 1st supplement: PN-RAA-879. Contact LTC Library for inter-library loans of citations

This bibliography contains both books and periodicals, in English and Spanish. There is no explanatory text. Journal abbreviations are supplied, as well as a subject index. Besides place names and general entries, subjects included are agrarian reform; agriculture; *campesinos;* colonization; commerce; credit; economic conditions; education; history; Indians; industry; labor; land tenure and use; law; migration; money, finance, and banking; politics and government; regional development; social conditions; statistics; transportation; and urbanization.
PN-AAC-174 $5.75

### REVOLUTION AND LAND REFORM IN ETHIOPIA: PEASANT ASSOCIATIONS, LOCAL GOVERNMENT AND RURAL DEVELOPMENT

Cohen, J. M.; Goldsmith, Arthur; Mellor, J. W.
1976, 132p.

Rural Development Committee
Center for International Studies
Cornell University, Ithaca, New York 14850

(In Rural development occasional paper no. 6)

This monograph relates the revolutionary change Ethiopia currently is undergoing to the dynamics (or stagnation) of the rural sector, with emphasis on the constraints and problems which must be overcome for progressive agrarian development to occur. Part I is an analysis of the causes of the military coup d'etat and the gradual transformation of a series of mutinies and civil disturbances into a social revolution dedicated to the termination of the landed aristocracy, establishment of socialism and generation of mass rural mobilization. Part II presents a legal analysis of the land reform proclamation and describes its effects on the major agrarian regions of the country. Part III analyzes the objectives of the land reform and future agrarian problems which the leaders of the new government, or any succeeding civilian or military regime, will have to solve. Finally, Part IV concludes with some comparative observations on land tenure in other countries, observations which clarify the probable results of the government's present rural development policies.
PN-AAC-184 $10.95

### LAND SETTLEMENT IN MALAYSIA, THE POSSIBILITY OF SELF-SUSTAINED DEVELOPMENT

Teow, Choo-ti
1971, 168p.

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

(Masters Thesis - Tennessee)

The primary objective of this study was to determine through conceptual analysis the adequacy of the Malaysian settlement program in stimulating, establishing, and maintaining self-sustained development in the new settlements so that living levels, in the long run, do not fall to subsistence levels. A subsidiary objective was to suggest alternative actions, based on experiences in other countries, which might be applicable to the Malaysian land settlement program. The procedure followed involved identifying those decisions in the design of a land settlement program that might increase the possibility of self-sustained development. Findings revealed that the present settlement program of the Malaysian Federal Land Development Authority is highly developed and efficient in the development of the land. However, a number of inadequacies in promoting self-sustained development arise, because the program emphasizes land development more than community development. From experiences in other countries, recommendations were made to remedy these inadequacies without excessive additional cost.

PN-AAB-848 $13.95

### LAND REFORM AND DEVELOPMENT, PT. 1: THE MODEL TESTED BY SCALOGRAMME ANALYSIS

Voelkner, H. E.; French, J. T.
1975, 25p.

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

(In Land Reform: Land Settlement and Cooperatives, no. 1, p. 1-14)

This study first examined previously developed hypotheses about the relationship of land reform to general development and second, tested the potential of an analytical technique known as Guttman Scaling as a mechanism for interrelating quantitative and qualitative data on social, political, and economic development to obtain a better overall perspective on a given country's level of development and a clearer picture of the relative impact of various factors in each of these three development categories at various stages in the development process. It was possible to develop and test as significant a General Development and Agrarian Reform model constructed for analysis and application to policy formulation and agrarian reform programs. It could be shown that qualitative data in binary form can be used to substantiate the phases and structural sequence of the model through the measured ranking of the existing level of individual countries in the development phase.

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