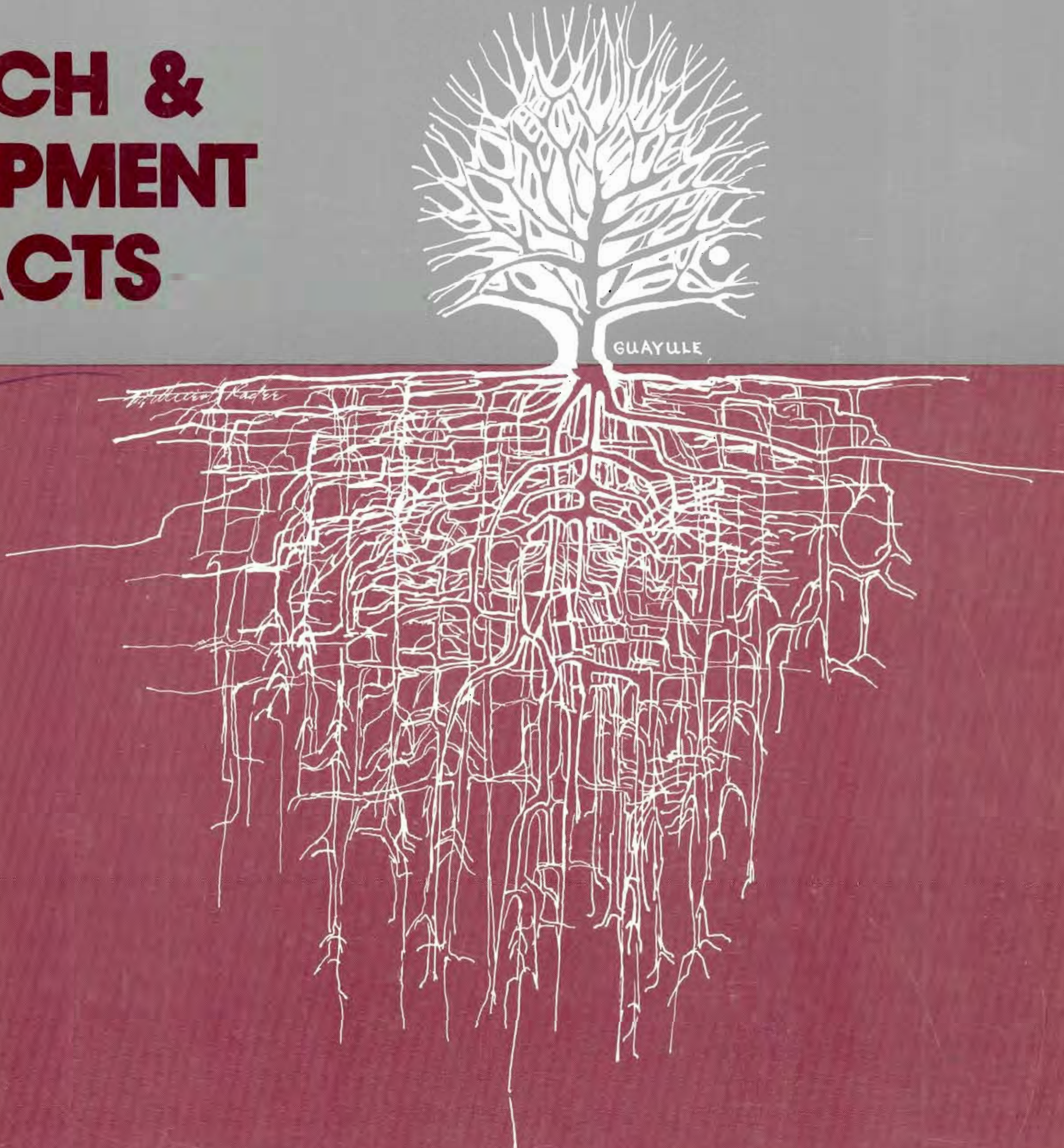
A.I.D. RESEARCH & DEVELOPMENT ABSTRACTS



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Volume 9, Number 1, February 1981

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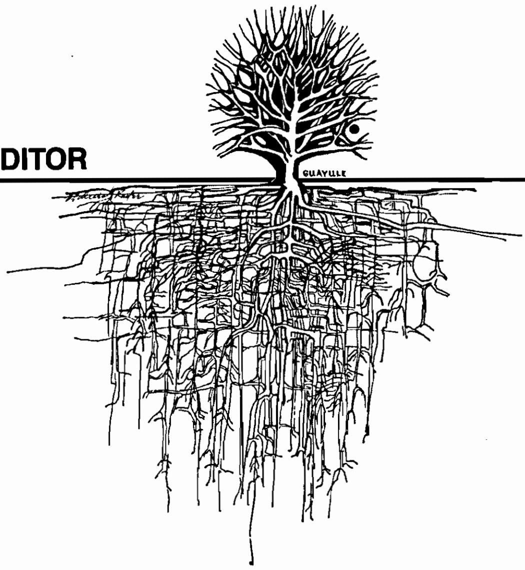
FROM THE EDITOR



Guayule, *Parthenium argentatum*

The cover design for this issue of ARDA illustrates a little known, but increasingly interesting plant — guayule. Guayule is a single-stemmed shrub normally reaching 2–3 feet in height with crooked, brittle branches, grayish-green leaves, and inconspicuous yellow flowers on short slender stems. Although rather fragile as a seedling, once established against competing growth, this unusual plant's adjustment to varying soil moisture conditions is remarkable. Following brief periods of rain, guayule will revive from several years' dormancy brought on by little or no rainfall. Guayule can send down tap roots to depths of 20–30 feet and, where the water table is more superficial, will concentrate massive lateral root systems between successive horizontal layers of clay and silt typically found in desert sands.

Growing wild in the Southwestern United States and Central and Northern Mexico, guayule originally became known for its rubber content which, intriguingly, is increased during low moisture conditions. The rubber, resins, and other chemicals extracted from this plant have been used over the centuries by Aztec Indians to fashion rubber balls for games; later by Mexicans to fire smelters and to heat bread ovens; by American, Mexican, German, and English companies for commercial exploitation; by the United States in World War II when supplies from Southeast Asia were cut off; and most recently, as less expensive substitutes for products normally refined from petroleum. Involved at one time or another in U.S. commercial development of guayule were such captains of American industry as Thomas Edison, Bernard Baruch, Meyer Guggenheim, and John D. Rockefeller, Jr. In 1930, a then-obscure Army Major, Dwight David Eisenhower, coauthored an exhaustive, investigative report which predicted annual production of 160 million pounds of rubber and creation of a strategic reserve of 250 million pounds from 400,000 acres. During World War II, the U.S. Congress authorized 500,000 acres for the Emergency Rubber Project of which only 32,000 were planted during the life of the project. After just three and one-half years of operation, data confirm that this scaled-down project resulted in not only 3 million pounds of rubber during the war, but also 21 million pounds in unharvested bushes that were destroyed in 1946. Today, using modern genetic engineering and production technology, those original 400,000 acres would yield nearly 700 million pounds of rubber over a 3-year growing cycle and more than a billion pounds with a 6-year growing cycle.

With a worldwide rubber market estimated at $14 billion for 1980, the continuing escalation of petroleum costs, the increased demand for rubber products in developing nations as they industrialize, the loss to settlement of marginal lands where guayule grows best, and the yield increases possible through modern technology, other governments may soon follow the United States and Mexico in appropriating financial, planning, management, and production resources to develop guayule's bounty.

For additional information on guayule, see item numbers 012, page 6, and 017, page 8.

PHOTO CREDITS: A.I.D. photos, pp. 13, 18, 23, 47, 49, 52, 53, 55, 56, Inside Back Cover. **World Bank photos, pp.** 3, 30, 31, 43.

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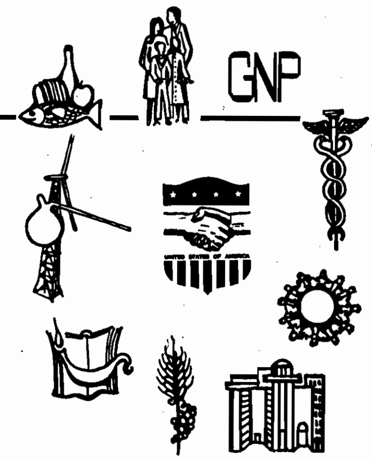

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Administrator .... M. PETER McPHERSON
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Director, Office of Development Information and Utilization .... LIDA L. ALLEN
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SUBJECTS AND DOCUMENTS OF SPECIAL INTEREST

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ARDA, "A.I.D. Research and Development Abstracts", is a quarterly abstract journal issued by the Division of Documentation and Information, Office of Development Information and Utilization, Bureau for Development Support.

What is the goal of ARDA?

The goal of ARDA is to transfer development and technical information to active practitioners in development assistance.

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ARDA's target audience is A.I.D. staff worldwide and selected key institutions in developing countries. Such institutions are government agencies, universities, libraries, research organizations, and other public and private sector organizations.

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ARDA presents abstracts of A.I.D.-funded current and less recent research studies, state-of-the-art reports, sector analyses, special evaluations, and other documents which, taken together, describe a broad spectrum of international development experience.

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QUESTIONS ET REPONSES RELATIVE À ARDA

Qu'est-ce qu'ARDA?

ARDA, "A.I.D. Research and Development Abstracts" (Résumés sur la recherche et la développement de l'Agence pour le Développement International), est une revue trimestrielle composée de résumés publiée par la Division de la Documentation et des Informations, Bureau des Informations sur le Développement et leur Utilisation, Bureau pour le Soutien au Développement.

Quel est l'objectif d'ARDA?

ARDA cherche à transmettre les informations techniques et axées sur le développement aux techniciens participant à l'assistance au développement.

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ARDA s'adresse au personnel d'A.I.D. dans le monde entier et aux institutions clés choisies, situées dans les pays en développement. Des institutions de ce genre sont des organismes publics, des universités, des bibliothèques, des organisations de recherche, et autres organisations des secteurs public et privé.

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ARDA présente des résumés d'études actuelles et moins recentes relatives à la recherche et financés par A.I.D., des rapports faisant le point des connaissances actuelles, des analyses sectorielles, des évaluations particulieres, et d'autres documents qui, ensemble, décrivent un large évantail de réalisation dans le domaine du développement international.

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¿Qué es ARDA?

ARDA, "A.I.D. Research and Development Abstracts" (Sumarios de Investigación y Desarrollo de A.I.D.), es un periódico trimestral publicado por la División de Documentación y Información, la Oficina de Desarrollo Información y Utilización, el Despacho de Apoyo al Desarrollo.

¿Cuál es el objectivo de ARDA?

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ARDA presenta extractes de estudios de investigación corrientes y menos recientes consolidados por A.I.D., informes del estado del arte, análisises del sector, evaluaciones especiales, y otros documentos que, juntos, describan un espectro ántlio de experiencia de desarrollo internacional.

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133 — PN-AAH-900

Publication number
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A REFERENCE COMPILATION OF SCIENCE AND TECHNOLOGY OFFICIAL DEVELOPMENT ASSISTANCE FURNISHED BY A.I.D. FOR THE LESS DEVELOPED COUNTRIES (LDCs)

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Titre
Titulo

Personal Author(s)
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Reynolds, A.; Gaithwright, T.

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Auteur Corporatif
Autor de Corporación

Logical Technical Services Corporation.

Document date and page numbers
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Fecha y número de páginas del documento

1980, 88 p.

Prepared for the United Nations Conference on Science and Technology for Development

Supplementary note
Nota supplémentaire
Nota suplementaria

Abstract
Résumé
Sumario

This research report, summarizing official development assistance provided by A.I.D. to LDCs, was produced to meet the needs of participants in the United Nations Conference on Science and Technology for Development. It represents a synthesis of A.I.D.'s economic assistance philosophy, which is characterized by a two-fold thrust: (1) a "basic human needs" approach to bilateral development assistance, which combines the furthering of U.S. interests abroad with U.S. humanitarian interest in that quarter of the world's population condemned to live at a substandard level; and (2) a refocussing of A.I.D.'s assistance to LDCs from sophisticated technology to light capital, labor-intensive applications of scientific and technological developments. The report concentrates on development assistance in the fields of health, nutrition, and population; energy and natural resources; employment, trade and industrialization, and access to technology; food, climate, soil, and water; and urbanization, transportation, and communication. In each case, the relevant technologies and means of technology transfer are discussed in conjunction with a statement of the development problem addressed by these technologies and with illustrative examples of A.I.D. programs. The report concludes that comparatively little U.S. technology can be transferred to LDCs without significant adaptation. The LDCs have become aware of the need for technologies tailored to fit their resource endowments and absorptive capacities, and stress is being placed on the development of more appropriate technologies as well as on devising policies and institutions permitting LDCs to make better technological choices. An extensive subject index is included in this report.

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AID/DSAN-C-0021 — 931023200

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Also available in French: PN-AAG-000, 88 p.

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001 PN-AAG-989

DEVELOPING AN APPROPRIATE GRAIN STORAGE SYSTEM

Anderson, D.G.
Kansas State University, Food and Feed Grain Institute.
1978, 50 p.

Prepared for the West African Community Workshop on Improved Grain Storage

Grain storage problems in LDCs are becoming increasingly critical. This document discusses this subject by presenting a computerized model for storage planning which was developed by Kansas State University. Since the model is complex, the document's focus is on offering general guidelines in the areas of storage facility size, location, type, and pricing. In regard to storage size, areas must be able to handle possible import requirements and crop surpluses during low supply periods. Higher grain volume can make large facilities feasible, which, due to economies of scale, can be very efficient. Improving transportation can also reduce costs and therefore make large storage centers feasible. Temporary and dual facilities should be used during excessive harvest periods and existing systems should be considered when evaluating new system needs. Finally, an even grain flow between producers and consumers can reduce storage needs. Storage location should have access to least-cost modes of transportation. Before selecting a location, storage and processing costs at various sites should be compared and new facilities should be meshed with existing structures. Local needs and storage costs should be compared with the options of exchanging grain with other localities that have different harvest periods. Sites should be in areas where the climate is favorable and suitable for commercial drying when this is needed. The placement of sites near consumers can prevent shipping problems, yet a decentralized system does diminish the advantages of attaining economies of scale. When considering the facility types, long-term storage sites require the installation of better grain protective measures than do short-term systems, yet their receiving and loading areas can be less efficient. Also, local building inputs should be used and the facility must be matched with the rest of the system. The design of multi-use facilities can reduce costs. Finally, pricing policies must consider the values created by storage, transportation, and processing in order to promote timely and correct investments which will affect the entire system.

AID/ta-C-1162 931078600

002 PN-AAH-116

RICE DRYING RATES

Robayo, J.F.; Pfost, H.B.
Kansas State University, Food and Feed Grain Institute.
1973, 40 p.

In Grain Storage, Processing, and Marketing, Research Report No. 4

Rice is ordinarily harvested at moisture contents above safe storage levels, so additional drying is usually necessary. Although a great many studies have developed formulas for computing grain drying rates, none has proven universally acceptable. This Master's Thesis is the result of research to develop first an empirical equation for drying a thin layer of rice, and second a mathematical model capable of determining the effects of many drying parameters on the drying results. After a brief introduction, the thesis begins with a review of the literature, concentrating specifically on rice-drying terminology and fundamental concepts of drying (thin layer and grain drying). Next, the experimental procedure is laid out. The equation used for thin layer drying was developed by T.L. Thompson in his mathematical model of corn drying. The same pattern was followed here, with the parameters changed and new ones fitted for rice. The drying process was considered to be divided into separate processes, including temperature equilibrium between the grain and air, moisture removal, and evaporative cooling of the air and grain. Four drying tests were made with temperatures from 100–130° F in order to obtain the different parameters. This is followed by a comparison of predicted and measured results. These are shown in graph and table form. A brief discussion of the drying results concludes the thesis. The major conclusion reached is that the temperature of the drying air is the principal factor in the rate of drying. Appended to the thesis is an 18-item bibliography (1936–72) of literature cited.

AID/csd-1588

003 PN-AAH-230

FARM MECHANIZATION, EMPLOYMENT, AND INCOME IN NEPAL: TRADITIONAL AND MECHANIZED FARMING IN BARA DISTRICT

Pudasaini, S.P.
International Rice Research Institute (IRRI).

In IRRI Research Paper Series, No. 38

Farm mechanization (and specifically tractorization) in the developed countries has occurred primarily as a response to high and rising wage rates. The recent spread of tractorization to countries with low wage rates such as India, Pakistan, and Nepal raises two sets of questions. First, what is the source of benefits that account for the private profitability where wage rates are not high? Are yields raised, does cropping intensity rise, or is the primary benefit the replacement of animals? Second, does the tractor lead to direct labor replacement or to a slow-down in the growth of labor demand available from other innovations? This paper attempts to answer these questions in the context of the Nepal Terai. A survey of traditional and mechanized farms in Bara district was conducted to assess the impact of mechanization on cropping intensity, income, employment, and efficiency. Production function analysis was used to "control" all differences, at least in a statistical sense. The results of the study were as follows: Cropping intensity, yields, income, and employment were higher on mechanized than on traditional farms. The much greater use of cash inputs and higher education levels associated with mechanized farms, however, made it difficult to attribute yields and income effects solely to machinery. Tractors could not be clearly linked with any on-farm labor displacement and pumpsets were found to raise farm employment. Tractor ownership allowed large farms to achieve higher cropping intensity through speedy and timely operations. Increased cropping intensity appeared to put a premium on timeliness for large farms, but did not seem important for small units. Tractorization permitted the farmers to nearly eliminate bullocks. The highest levels of efficiency were achieved by pumpset-owning and tractor-hiring farms rather than large tractor-owning farms.

AID/DSAN-G-0083 931082600

004 PN-AAH-231

EVAPOTRANSPIRATION FROM RICE FIELDS

Tomar, V.S.; O'Toole, J.C.
International Rice Research Institute (IRRI).
1979, 17 p.

In IRRI Research Paper Series, No. 34

Evapotranspiration is a primary component of the energy exchange function determining the production potential of crop species and the distribution of natural vegetation. It is highly correlated with net productivity. Realistic evapotranspiration estimates are important to irrigation engineers, agronomists, and others involved in agricultural planning. Although abundant data have been accumulated on evapotranspiration in rice growing countries, and the sciences of soil physics, plant physiology, and micrometeorology are becoming increasingly exact and quantitative, misunderstanding and misconceptions still abound. The present paper, based on a review of available literature on evapotranspiration in the wetland rice crop in South and Southeast Asia, describes evapotranspiration as a complex process affected primarily by climatic conditions. The basic principles affecting transpiration, evapotranspiration, and the ratio of actual evapotranspiration to open pan evaporation (ET–EP) in wetland rice culture are reviewed. Large differences in daily as well as seasonal total transpiration and evapotranspiration values exist for various locations in South and Southeast Asia. Crop transpiration rate is low at the early stage of growth and increases almost linearly, reaching 3–4 mm/day at maximum tiller number stage and 5–7 mm/day at heading time. Evapotranspiration also follows a similar trend for maximum rate. The seasonal average evapotranspiration in wetland rice fields is in the range of 4–7 mm/day. Evapotranspiration appears to vary with crop growth stage. The value of crop growth coefficient factor (ET–EP) is 1.0 at transplanting, reaching about 1.1 at maximum tiller number stage and about 1.2 or higher at flowering stage. A 1.15–1.2 ratio with open pan evaporation can be used to estimate ET for a crop season. From this review of physical and empirical information, a simple model is suggested to predict evapotranspiration from wetland rice. The authors caution the reader of the difficulty of interpreting the voluminous literature because of the interaction of varying seasonal climatic patterns, crop canopy development rates, and potential experimental and technical errors.

AID/DSAN-G-0083 931082600

005 PN-AAH-233

GENETIC ANALYSIS OF TRAITS RELATED TO GRAIN CHARACTERISTICS AND QUALITY IN TWO CROSSES OF RICE

Soomrith, B.; Chang, T.T.; Jackson, B.R.
International Rice Research Institute (IRRI).
1979, 16 p.

In IRRI Research Paper Series, No. 35

The development of semidwarf rices has markedly upgraded the yield potential of tropical rice. However, concurrent progress in incorporating traits related to fine grain quality into semidwarfs lags behind that for pest resistance and grain yield. This report discusses research aimed at determining the mode of inheritance and genotypic correlation on several characteristics of grain quality in crosses involving a semidwarf with the improved plant type as well as with two tall Thai varieties with good grain quality for the export market. Rice crosses IR648-3-1-2-3/GOW Ruang 88 and IR648-3-1-2-3/Khao Pahk Maw 148 were studied to determine the genetic components of five grain characteristics and plant type, and the genotypic relationship between the two groups of characteristics. Analysis of generation means indicated that the variation in 100-grain weight was largely due to additive gene effect. Both additive and dominance effects were major contributors to the variation in grain length and the ratio of grain length to width. Variations in chalkiness score and alkali digestion index in IR648/KPM148 were largely due to additive gene effect. In IR648/GR88, both additive and dominance effects were important. For amylose content, dominance effect appeared more important than additive gene effect. Estimates of inheritability for grain length, length-width ratio, alkali digestion index, chalkiness, and amylose content ranged from moderately high to high. In both crosses, grain length exhibited a significant association with the degree of slenderness, low degree of chalkiness, low gelatinization temperature, and high amylose content. The 100-grain weight was significantly and positively correlated with grain length, translucency, and amylose content. High amylose content was strongly correlated with low gelatinization temperature. The different types of gene effects controlling selected traits and the independence between the yield component characters and grain characteristics found in this study provide directions in formulating useful, effective, selection procedures for specific traits or the combination of desired traits in a breeding program. A list of 25 references (1952–73) is appended.

AID/DSAN-G-0083 931082600

006 PN-AAH-234

DETERMINING SUPERIOR CROPPING PATTERNS FOR SMALL FARMS IN A DRYLAND RICE ENVIRONMENT; TEST OF A METHODOLOGY

Garrity, D.P.; Harwood, R.R.; Zandstra, H.G.; Price, E.C.
International Rice Research Institute (IRRI).
1979, 13 p.

In IRRI Research Paper Series, No. 33

Strategies for increasing farm productivity that focus on introducing technical changes within a single-crop enterprise are often rejected by farmers because of unforeseen negative effects on productivity or resource utilization. Cropping systems research approaches the problem of fitting relevant technology into the small farm operation by determining the effects of potential technical changes on the entire system. This paper discusses the methodology for cropping systems research for dryland rice-based systems in the Philippines. Test patterns are grown on a portion of each cooperating farm under joint farmer-research team management. This methodology involves the farmer as an active participant in research activities. The farmer's participation in pattern testing facilitates early detection of some of the constraints to adoption at the farm level. The potential for increased crop productivity was tested in the Batanga region where the predominant cropping pattern involves dryland rice followed by field corn. In this program, alternative cropping was tested, including: following rice with alternative field crops that may offer advantages over corn; following rice with two crops to extend cropping further into the dry season; and following rice with intercrop patterns to replace monoculture corn. Alternative crops included soybean, peanut, mung bean, and cowpea. After 3 years of testing, it was found that adoption of an improved corn variety could increase productivity in the dryland rice–corn system studied. Soybean and sorghum appeared to be outstanding alternative crops. However, because neither is presently grown in the area, their adoption would represent a substantial change in the system. New infrastructural support, markets, and threshers would be required. Intercropping of corn shows the potential of substantially raising land productivity, but lack of labor appears to be a potential constraint. Cropping patterns with three crops per year were shown to be feasible and profitable. Thus, this field-testing program showed many ways to increase land productivity for dryland rice farmers. This paper has an attached bibliography of 11 references (1972–76).

AID/DSAN-G-0083 931082600

Workers transplant high-yielding varieties of rice in Bangladesh.

AGRICULTURE

007 PN-AAH-235

AN ANALYSIS OF THE LABOR-INTENSIVE CONTINUOUS RICE PRODUCTION SYSTEM AT IRRI

Morooka, Y.; Herdt, R.W.; Haws, L.D.
International Rice Research Institute (IRRI).
1979, 43 p.

In IRRI Research Paper Series, No. 29

In September 1976, the Department of Rice Production Training and Research at the International Rice Research Institute (IRRI) began a one-year study of the agronomic and economic feasibility of a labor-intensive continuous rice production system (rice garden system). This paper compares the IRRI system with conventional production systems used in the Philippines. The comparison is carried out in terms of production, land use, labor distribution, water requirement, and the economics of the system (costs and returns to labor and capital, forms and amounts of capital used, and the cost of irrigation needed for highly intensive, small scale, production systems). A 1-hectare field was divided into 40 plots of 250 square meters each and these were transplanted every other day. Alternate plots were harvested on alternate days, 6 days a week. Gains resulted from this turnaround so that four crops per year were grown. During 1977, about 23 turnarounds per hectare (t/ha) were harvested and three men were fully employed with a relatively constant cash income flow, as compared with partial employment for one man and 10 t/ha from the double-crop rice system currently in use in the Philippines. The rice garden system thus provides dramatic opportunities to increase labor earnings, family income, and productivity of small rice farms. Specifically, the rice garden system efficiently uses about twice as much labor, uses land throughout the year, and produces three times that of the conventional two-crop rice production systems. The system also allows farmers to minimize damage caused by typhoon or pest epidemics because the stage of growth is different for each plot. Disadvantages are also cited. These are: (1) the possibility of a greater stress on the plants causing possible breakdown of disease resistance; (2) farmers without irrigation facilities could not use the system year round; and (3) the small plot size leads to labor intensity. A list of 13 references (1961–77) is appended.

AID/DSAN-G-0083 931082600

008 PN-AAH-236

ALIWALAS TO RICE GARDEN: A CASE STUDY OF THE INTENSIFICATION OF RICE FARMING IN CAMARINES SUR, PHILIPPINES

Morooka, Y.; Masicat, P.; Cordova, V.; Herdt, R.W.
International Rice Research Institute (IRRI).
1979, 25 p.

In IRRI Research Paper Series, No. 36

The continuous rice production system, or rice garden, was developed by The International Rice Research Institute (IRRI) as a method of intensifying rice farming. This report examines how one farmer in the Philippines developed this system, including the settling of difficulties involved in adopting and managing the system. This farmer is contrasted with two neighboring farmers using less intensive systems. There is a private gravity irrigation system available to all farmers which provides a year round water supply. Of the three farmers studied, two of them used staggered planting systems while one used simultaneous planting in which the whole paddy area is planted at once. Farmer A was the only one using the continuous rice production system, which includes staggered planting. Farmer B's application of current inputs was lower than the total inputs of Farmer A. Almost all tasks were performed with hired labor under traditional arrangements. Farmer C cultivated his farm with simple equipment, but used current inputs at a higher level than the total inputs of Farmer B. Farmer A had much higher rice yields, but he also had a higher degree of farm management problems. The most severe of these was the seasonality of labor use on his farm. Competition for hired labor frequently occurred among farmers because all labor-intensive practices occurred at the same time. To maintain an appropriate number of hired laborers for transplanting and harvesting, Farmer A made an arrangement whereby transplanters received the right to participate in harvesting and threshing, and to receive a one-eighth share of the harvest. In addition, Farmer A paid cash to workers for transplanting. The other two farmers used the traditional system of giving laborers a portion of the harvest. Farmer A used a larger amount of fertilizer than the others and this increased his yield. He also used specific pesticides for specific diseases, whereas the other farmers used the same pesticides for all diseases. This seemed to increase the health and yield of Farmer A's crop. Farmer A's greater use of farm machinery decreased hand labor and increased crop yield. A list of five references (1977–79) is appended.

AID/DSAN-G-0083 931082600

009 PN-AAH-237

CHANGES IN RICE HARVESTING SYSTEMS IN CENTRAL LUZON AND LAGUNA

Kikuchi, M.; Cordova, V.G.; Marciano, E.B.; Hayami, Y.
International Rice Research Institute (IRRI).
1979, 26 p.

In IRRI Research Paper Series, No. 31

Dramatic changes in rice harvesting and threshing arrangements are occurring in the Philippines in response to growing population pressures, land reform, improvements in irrigation systems, and the introduction of modern rice varieties. Using data collected from 100 farms, this study discusses the geographic and historical changes in harvesting and threshing arrangements in Central Luzon and Laguna, one of the country's major rice-producing areas. Harvesting and threshing represent major employment opportunities for landless workers and for small farmers whose incomes from farming are insufficient to meet their subsistence needs. After the harvest, production costs are deducted from the output, and the residual is divided between the landlord and the tenant, with harvest workers also receiving a significant share because harvesting and threshing costs are usually the largest items among production costs. In the Philippines, the crop is usually cut by hand, but threshing methods vary from hand beating to large mechanical threshers. The more mechanized the operation, the smaller the laborers' share of the harvesting cost. Interacting with the choice of threshing technology are several contractual arrangements. The choice of technology and contractual arrangement depends partly on relative prices of capital and labor and technical conditions; and partly on risk, such as that of insufficient labor at peak periods. Social and institutional environments also weigh heavily on the harvesting and threshing technology. The landlord-tenant relationship is an especially critical factor. In the Central Region, this relationship is a paternalistic one, to the benefit of both parties. Here, modern technology has taken a foothold, and although most of the harvesting is still performed by hand beating, small machines are used extensively for threshing. In the Central Luzon, where large haciendas and large threshing machines were formerly the rule, haciendas have been broken up into smaller farms. Since this has occurred, large threshing machines are being replaced by either hand threshing or small threshing machines. For harvesting, hand beating is the rule. Appended is a list of 15 scientific references (1920–78).

AID/DSAN-G-0083 931082600

010 PN-AAH-423

SOME DIMENSIONS OF TRADITIONAL FARMING IN SEMI-ARID TROPICAL INDIA

Jodha, N.S.
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
1979, 31 p.

In Economics Program, Progress Report No. 4

To better understand the constraints and potentials of traditional farming systems and to use this understanding to develop new technology for semiarid agriculture, this paper examines the rationality behind some of the traditional farming practices. It is based on studies conducted from 1975 to 1978 by the International Crops Research Institute for the Semi-Arid Tropics of 30 small, medium, and large farms in six villages in three agroclimatic zones of peninsular India. Results of direct relevance to generating new technology for semiarid tropical areas include the following: In the deep Vertisol areas, the practice of fallowing land during the rainy season and planting after the rainy season is important for small farmers. In the largely rainfed areas, the traditional practice of intercropping covers 35–73% of gross cropped area, while the extent of intercropping declines with increases in irrigation, practiced mainly on larger farms. As revealed by the number of crop mixtures (as high as 84 in a single village), traditional intercropping is highly complex, partly due to farmers' informal experimentation with crops able to satisfy production and environmental requirements. Hence, generation of low-cost technology for intercropping may help the less prosperous farmer. In turn, it appears that egalitarian objectives can be achieved through resources allocated to intercropping technology rather than through institutional means. While developing new intercropping technology, the many objectives of the farmer, such as profitability, employment, and subsistence, should be taken into account. Among other requirements for integrated watershed-based technology, large land areas are needed. However, land ownership and usage patterns of traditional farming systems pose institutional constraints. Due to the lack of individually owned land parcels large enough to constitute a composite miniwatershed, no alternative to group action exists which can ensure management of land for higher productivity and conservation on a watershed basis. To induce such group action, however, watershed technology must become highly profitable. For further reference, 21 entries (1963–79) are provided.

AID/ta-G-1421 931097200

011 PN-AAH-424

INTERCROPPING IN TRADITIONAL FARMING SYSTEMS

Jodha, N.S.
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
1979, 22 p.

In Economics Program, Progress Report No. 3

Intercropping is a widely practiced farming system in many developing countries. Perhaps because of the complexity of intercropping, little research has been devoted to the subject, stifling the development and spreading of new agricultural technology for intercropping systems. This paper discusses only a few dimensions of intercropping as practiced in six semiarid tropical villages in India. Based on plotwise details of cropping patterns of sample farmers during three agricultural years (1975–78), it highlights two important features, having significant research and policy implications, of traditional intercropping systems. First, intercropping is more important on small, rainfed farms than on large, irrigated farms. Thus, any breakthrough in intercropping technology will be of most use to the poor, small farmer. Secondly, the traditional intercropping system is highly complex and diversified as indicated by a multiplicity of combinations in crop mixtures, as well as by its manifestation through a variety of other factors. From village to village, mixtures involving two crops were popular but those involving five to eight crops were not uncommon. Viewed from their share in gross cropped area, the most important mixtures were different in different villages. Farmers must satisfy both profit and subsistence requirements which can be served simultaneously by raising high-value cash crops like cotton and groundnuts and subsistence crops like sorghum and pigeonpea. The drought resistance of crops and their suitability for maintaining soil fertility, fodder requirements of farm animals, and the various soil contents constitute other factors affecting farmer decisions on specific crop mixtures. The author argues that the development of complicated intercropping systems is unnecessary. The best strategy lies in evolving a few simple intercropping systems which can satisfy such key objectives as profitability and stability, while keeping in mind labor use and soil fertility. These new systems should incorporate new agrobiological components, such as high-yield varieties, as well as new knowledge about land and water management. Ten bibliographic entries (1949–78) are included for further reference.

AID/ta-G-1421 931097200

AGRICULTURE

012 PN-AAH-497

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE UTILIZATION OF GUAYULE, TUCSON, ARIZONA, 1975

McGinnies, W.G.; Haase, E.F.
University of Arizona.
1975, 180 p.

Guayule is a shrub resembling sagebrush which grows wild in North-Central Mexico and nearby areas of the Big Bend region of Southwest Texas. It is a source of rubber and resin. To fill the demand for rubber during World War II, full-scale production and harvest of guayule resulted in the extraction of three million pounds of its rubber. In 1946, 21 million pounds of rubber were destroyed unharvested, and production of guayule abandoned for as yet unexplained political reasons. This report contains the proceedings of the International Conference on the Utilization of Guayule, held to apply knowledge gained from past guayule experimentation to some of the critical economic issues facing the United States and the developing world, and to assist decisionmakers in determining the merits of guayule as a source of domestic rubber. Technical subjects presented include pre- and post-World War II guayule production; the Emergency Rubber Project; seed treatment and nurseries practices of 1942; field production and harvesting; propagation from cuttings; experimental plantings in Israel; activities of the Continental-Mexican Rubber Company; guayule diseases; rubber extracting and processing; guayule rubber utilization; deresination of guayule rubber; rubber production activities in Mexico; physiology and chemistry of guayule; soil-plant relationships; climatic relationships in the growth and production of guayule; California, New Mexico, Texas, and Arizona indicator plots; genetics and plant breeding; genetic and agronomic research; market potential and economic production; and retting. It was found that guayule production is readily mechanized; its moisture and fertilizer requirements are relatively low; guayule is physiologically ideal for genetic improvement; it is susceptible to common controllable diseases found in many conventional crops; and that its by-products — wax, wood pulp, and resin — may become important. A list of conference participants concludes the report.

AID/ta-G-1111 931015900

013 PN-AAH-511

NEW LANDS PRODUCTIVITY IN EGYPT: TECHNICAL AND ECONOMIC FEASIBILITY

Hesser, L.F.; Asmon, I.; Hedlund; F.F.; Gotsch, C.; Kean, J.; Leatham, W.; Parker, C.; Sparrow, G.B.; Stelly, R.; Sukkary, S.
Pacific Consultants.
1980, 214 p.

In Working Papers: PN-AAH-527, 288 p.

The Government of Egypt (GOE) has made heavy investments in land reclamation over the past 25 years and maintains a strong commitment to land reclamation. This study examines the technical and economic feasibility of land reclamation activities currently being considered by the GOE. It was found that the soil, water, and climate of many desert areas in Egypt are such that agriculture is technically feasible if adequate management and support services exist. The investment opportunities for individual farm units are generally positive in that high returns on investments, which are federally subsidized, are possible. The main economic difficulty in reclaiming new lands is the rising cost of energy. Where water must be lifted more than 20 meters, costs as compared with benefits do not appear economically feasible. Sprinkler irrigation projects do not appear feasible for the same reason. On the whole, large-scale reclamation of new lands can take place only at the expense of foregone alternative investments. On the other hand, rehabilitation of selected low-lying lands already reclaimed has a good potential for being both technologically and economically feasible. Nonetheless, a number of land reclamation opportunities with potentially attractive rates of return do exist. Criteria for such potential projects are as follows: (1) highest priority should be given to rehabilitating already reclaimed lands in areas where the required water lift is low; (2) public sector investments in reclamation of new lands should be oriented to reclamation projects in low-lying lands or projects involving water lift of only a few meters; (3) energy-saving irrigation methods should be used both in reclamation and rehabilitation projects; and (4) joint ventures to test for higher yields should be encouraged, as should reclamation through homesteading. Priority topics should include: improved agronomics, low-energy irrigation methods, rehabilitation of low-lying, badly drained, resalinized soils, and alternative means of organization for the operation and maintenance of irrigation systems. A bibliography (21 items, 1972–79) and annexes are included.

AID/ne-C-1645 263004200

014 PN-AAH-527

NEW LANDS PRODUCTIVITY IN EGYPT: TECHNICAL AND ECONOMIC FEASIBILITY WORKING PAPERS

Pacific Consultants.
1980, 288 p.

In Working Papers 1-10, Main Report: PN-AAH-511, 214 p.

Land reclamation has recently captured the interest of government officials in Egypt. Most new lands reclamation is being accomplished in desert regions. This report contains nine working papers which relate detailed backgrounds and descriptions of previously performed feasibility studies. Topics which are included in these working papers are: (1) crop budgets and farm plans; (2) sociological considerations, Tahaddi: a case study; (3) credit and input supply system; (4) marketing system; (5) prices; (6) perspectives for fresh produce exports; (7) agricultural research; (8) comparison of benefits of different agricultural projects; and (9) making technology the variable. Working paper one details the types of crops currently grown in the new lands, the effect of crop rotation, crop yields, the cropping pattern, and the methodology used on graduate farms. The second working paper discusses the meaning of the term, land reclamation, as it applies to different peoples in Egypt who live on these reclaimed lands. Tahaddi is the site of this case study and the working paper includes discussion of the research methodology and results of the research. Working paper three concerns farming cooperatives in the Tahaddi area. Working paper four discusses market prices and quotas, consumer cooperatives, producer organizations for marketing, and training marketing personnel. Price policies are the main subject of the fifth working paper. Working paper six discusses seasonality of exports, tariffs, trade, and competition. The seventh working paper presents conclusions and recommendations on subjects relevant to Tahaddi as well as descriptions of agricultural research institutions in Egypt. These include: the Agricultural Research Center, the Soils and Water Research Institute, the Desert Institute, the South Tahrir Company, the American University in Cairo, and the Academy of Science. Working paper eight discusses returns on agricultural investments in the new lands and agricultural improvements in the old lands. The ninth working paper discusses irrigation technology in Tahaddi. A 21-item bibliography (1976–79) and a comparison of benefits of agricultural products is appended.

AID/ne-C-1645 263004200

015 PN-AAH-565

SUBJECTIVE PRODUCTION FUNCTION PARAMETERS AND RISK: WHEAT PRODUCTION IN TUNISIA

Roe, T.; Nygaard, D.
University of Minnesota, Department of Agricultural and Applied Economics.
1979, 14 p.

In Staff Paper, pp. 79-43

The problems of resource allocation by farmers become acute when the parameters of the underlying technology are not known with certainty. The problems become even more acute if these parameters vary in some complex manner, as in the case of wheat, with yearly weather, soil moisture, disease, and other soil and atmospheric conditions affecting plant growth. This paper explores these probems, by focusing on 125 farmers in Northern Tunisia during the 1976-77 crop year. The farmers' holdings ranged in size from 2 to 381 hectares (ha), with an average of 27 ha planted in durum wheat. The authors maintain that Tunisian farmers form subjective estimates of the parameters of the underlying production function. To substantiate this thesis, each farmer was interviewed twice during the crop year. The first interviews were conducted at the time of seedbed preparation, with the farmers providing estimates of their yield at harvest (given the current available level of inputs and assuming that normal weather conditions would prevail during the growing season). Each farmer was interviewed again at harvest. The results suggest that the farmers overestimated their yields, but that the cause of this overestimation was unusually low rainfall. Otherwise, the farmers appeared to correctly perceive the true parameters of their total possible output. In addition, the farmers were generally found to be risk adverse (in terms of allocating resources and adopting new high-yielding varieties), when the source of the uncertainty was weather and/or prices. The authors note that the mathematical method used in this study is unique and appears to be a reasonable approach to measuring and identifying the cause of allocative error, risk, and the value of providing this information to farmers. Previous researchers have relied on cost minimization or profit maximization frameworks to determine the effects of risk and uncertainty on resource allocation and the use of technology. The conceptual framework employed in this study takes into consideration both of these elements. A brief bibliography (13 English titles and 1 French title, 1966–77) is included in the report.

AID/ta-BMA-5 931023600

016 PN-AAH-566

INSTITUTIONAL FACTORS AFFECTING THE ADOPTION OF AGRICULTURAL SECTOR ANALYSIS METHODOLOGY IN LDC'S

Klein, H.; Roe, T.
University of Minnesota, Department of Agricultural and Applied Economics.
1978, 20 p.

In Staff Paper, P78-10

Despite recent efforts to develop and apply agricultural sector analysis (ASA) models in LDCs, data on the institutionalization of ASA techniques within policymaking sectors remain lacking. This document discusses the issues and constraints regarding such institutionalization, as exemplified in the ASA model developed in Tunisia. After a brief outline of the Tunisian model itself and a brief review of the literature on the use of ASA methods in general, the question of institutionalization of ASA methods in Tunisia is explained. Several general insights can be drawn from the Tunisian experience. First, the models that are used must be understood by the operating host officials and fall within their authority. This was not entirely the case in Tunisia. In addition, further decomposition of the ASA model would have yielded more utility. Also, data should be collected through government channels so that any updating of the model will not be constrained by the need to allocate sources to obtain the new data. The analytical model should be built upon a progression from field work up to model coefficients. This is important for training and provides for consistency checks. The model and selection of techniques should not be beyond the capabilities of the implementing agents. The specification of time, space, and form dimension variables should be related to the instruments and variables used by the host implementing agency. Dialog between builders and planners during the preliminary stages can provide knowledge so that institutional constraints and informational channels can be dealt with more efficiently. If ASA techniques cannot be applied to traditional structures, they must be closely linked with the decisionmaking authorities. Finally, institutionalization problems appear to be related to the resources, structure, and behavior of host country institutions. The paper concludes by suggesting that these factors should be kept in mind by ASA analysts if ASA methods are to exert an important influence on policymaking. A bibliography includes 14 English titles (1972–76).

AID/ta-BMA-5 931023600

AGRICULTURE

017 PN-AAH-568

GUAYULE: A RUBBER-PRODUCING SHRUB FOR ARID AND SEMIARID REGIONS

McGinnies, W.G.; Haase, E.F.
University of Arizona, Office of Arid Lands Studies.
1975, 273 p.

In Arid Lands Resource Information Paper No. 7

Guayule, the only species of the genus *Parthenium* known to produce significant amounts of rubber, is a shrub native to the dry lands of north central Mexico and the adjacent Big Bend area of Texas, usually growing at an altitude between 2,000 and 6,000 feet. It is largely restricted to outwash slopes of calcareous soils in regions having an annual rainfall of 10–15 inches, that occurs principally in late spring and early autumn. Although guayule is grown commercially in the U.S., extensive scientific research has provided the necessary methods for its successful culture and for rubber production elsewhere. This historical review of the cultivation of guayule in the U.S. was produced in order to aid in the eventual establishment of guayule as a thriving commercial enterprise among Southwestern Indians and other peoples in arid and semiarid zones. In 1930, an investigation undertaken by the War Department underscored the interest of the U.S. government in encouraging the domestic guayule industry in order to reduce dependency upon foreign markets, provide a certain national source of rubber in a grave emergency, and employ thousands of American farmers and laborers. In response to the investigation, federal legislation providing for the planting of guayule was passed. This legislation and the subsequent research and operational investigations undertaken to optimize production are described. Detailed attention is given to guayule agronomy, including its ecology, seed and seed handling, nurseries, field practices, insect and disease control, harvesting, and methods of extracting rubber. Attached to the historical review is a bibliography prepared primarily for participants in the International Conference on the Utilization of Guayule, held to explore the state of knowledge and available information on the guayule rubber plant from pre-World War II days through recent developments and to deliberate on the immediate and future economic potential of guayule. The bibliography contains more than 900 entries (1900–73), for which 225 brief annotations were prepared. A number of unpublished, but available, documents have been included to provide as complete a bibliography as possible.

AID/ta-G-1111 931015900

018 PN-AAG-845

RECOMMENDED SUPPORT FOR GRAIN POLICY DEVELOPMENT AND IMPLEMENTATION IN SRI LANKA

Borsdorf, R.; Anderson, D.; Anderson, D.
Kansas State University.
1979, 136 p.

What are the problems currently hampering the development and implementation of a rational grain policy in Sri Lanka? The present study attempts to answer these questions in view of potential USAID support. This study is divided into three sections. The initial section focuses upon basic needs in marketing policy development. Current policy is tilted towards political rather than economic rationalization with mixed results. On the one hand, the proliferation of government marketing agencies has caused a duplication of marketing functions and a lack of policy coordination. On the other, pricing policies aimed at increasing paddy production have been successful, but the impact is uncertain, leaving future policy without a clear direction. Major needs are in data collection and analysis (including the institutionalization of this capability) and coordination of data analysis with policy decisionmaking. Problems and needs of the Paddy Marketing Board (PMB) are discussed next. The PMB's role is not clearly defined; its activities are uncoordinated with the other agencies having paddy and rice marketing responsibilities; and its organizational structure is deficient in upper management personnel. While recent pricing policies directed by the PMB have been sound, its staff suffers from a serious lack of data collection/analysis and management skills. The PMB must refine its pricing system, direct more attention to reserve stocks, and clarify its objectives. A third and final section discusses the dryland farming sector. While production resources sufficient to greatly expand dryland farming do exist, little is known about the marketing institution's capability for handling increased production. Also, little is known about the comparative production advantages of Sri Lanka's crops or their marketing potential. A study of cropping and marketing options must be made and the procurement and sale of dryland crops must be clarified. Also, consideration should be given to a modest price rise in coarse grains and the expanded production of fingermillet and sesame. Included in each of the above sections are specific recommendations for donor support. A 33-item bibliography (1969–79) is also included.

AID/ta-C-1162 GTS 931078600

019 PN-AAH-063

POTENTIALS AND PITFALLS OF PRODUCT MARKETING THROUGH SMALL FARMER GROUPS

Fox, R.
1978, 21 p.

In December 1978, a Central Treaty Organization (CENTO) seminar was held in Lahore, Pakistan, on increasing the productive capacity of small farmers. This report was prepared for and presented at this seminar. The author discusses programs to improve the general marketing system as well as marketing through small farmer groups. Food products, agricultural inputs, and rural consumer goods are three markets identified as relevant to small-scale producers. These programs involve changes in market infrastructure, economic policy, and legal measures, such as the construction of roads, the establishment of credit programs, and a uniform system of grades, weights, and measures. Improvements in the general marketing system are then applied to product marketing through small farmer groups. Improved processing and marketing through vertical integration, economies of scale, and increased bargaining power of small farmers vis-a-vis middlemen and processors are three economic arguments presented in support of product marketing through group action. However, the report also describes difficulties in forming effective product marketing groups, such as the small farmers' lack of capital and organizational resources. Furthermore, government intervention through farm-level price-fixing, as well as outside competition in traditional marketing systems, limits the small farmers' gains. An examination of these problems led the author to conclude that the potential of product marketing through small farmer groups is limited. The report concludes with recommendations for establishing effective marketing programs through group action. For example, economic success requires that local production and marketing systems be considered in the design of group action programs. In addition, group action programs must be technically feasible, distribute benefits equitably, and be accompanied by complementary improvements in the general marketing system. Included in the report is an appendix of supply and demand graphs to illustrate the effects of improved product marketing on food prices.

AID/ne-C-1578 290020000

020 PN-AAH-241

FORMULATION OF LINKAGES IN RURAL REGIONS FOR PURPOSES OF REGIONAL DEVELOPMENT RESEARCH

Applegate, M.J.; Badger, D.D.
Oklahoma State University.
1979, 98 p.

Techniques or tools to measure impacts of government programs and projects on the lowest income groups in the LDCs are urgently needed. An A.I.D. research project, for which this document is a final report, addressed that need by attempting to identify linkages among the rural poor, urban poor, and other sectors of the economy by means of a low-cost methodology study. Understanding these linkages, which are defined as market transactions or flows of goods and services among population segments, economic sectors, and regional locations, is a prerequisite to any reliable project analysis. The research project was specifically designed to analyze the linkages of two rural LDC regions and to test hypotheses pertaining to agricultural and regional development emanating from differences in the extent and form of linkages. Nicaragua was selected for study on the basis of a number of considerations spelled out in the introduction to this report. The methodology is discussed in the following section. Next, the regions selected for analysis are described in terms of topography and climate, vegetation and soils, agricultural and livestock activities, land use, highway and road network, and population characteristics. Following this, the results and interpretation of data are presented. Among the important differences noted by the authors in the nature of linkages was that both consumers and producers in the region where traditional agriculture is most common are apt to depend upon counterparts in the local community in which they reside, whereas those in regions characterized by a more sophisticated agricultural technology tend to rely on purchases in the regional center and outside the region. The authors concluded that government programs such as construction of infrastructure will have a relatively greater positive indirect impact on rural development and on reducing poverty if carried out in areas in which the linkages to a large regional center or to outside the region are not well-developed. A list of six Spanish and English language references cited, two questionnaires used, and the input-output matrix are appended.

AID/ta-C-1427 931115700

021 PN-AAG-789

UTILIZATION OF PHOSPHATE ROCK IN TROPICAL SOILS OF LATIN AMERICA

Fenster, W.E.; Leon, L.A.
International Fertilizer Development Center (IFDC); Centro Internacional de Agricultura Tropical (CIAT).
1978, 49 p.

The high cost of fertilizers, especially those containing high amounts of phosphorus (P), is one of the main limiting factors in increasing crop production in tropical Latin America. The direct use of phosphate rock (PR) or of some of its low-input altered products would seem to present a logical approach to overcoming this constraint. This paper selectively reviews the literature on soils and phosphorus fertilizer problems in tropical Latin America, identifies objectives for further research, and outlines a research program to meet those objectives. After a brief introduction, the literature review is presented. The review is divided into the following categories: (1) general P and soils review; (2) direct application of PR to soils; (3) characterizing phosphate rocks; (4) greenhouse and field investigations with PR; (5) greenhouse and field investigations with partially acidulated PR; and (6) greenhouse and field investigations with thermally altered PR. Next, the objectives of the research proposal are spelled out. First, an evaluation of the effectiveness of sources and methods of application of P fertilizers on soils of tropical Latin America is needed. Second, the research should determine the forms and availability of the reaction products of these fertilizers in soils as related to their initial and residual effectiveness. Finally, criteria need to be established for applying the results of the first two objectives to different soils and crops at various locations by conducting field experiments on selected soils throughout tropical Latin America. It is proposed that these objectives be accomplished through interrelated and pertinent laboratory, incubation, greenhouse, and field experiments. Currently, it is planned that the research will be carried out in Colombia, Brazil, Peru, Ecuador and other countries as may be appropriate over a 7–10 year period. The final part of the paper presents the reasoning and justification for the proposed research. Various charts and graphs and a 51-item bibliography (1943–77) of English, Spanish, and Portuguese language references are also included.

AID/ta-G-1218 931005400

022 PN-AAG-790

MANAGEMENT OF PHOSPHORUS FERTILIZERS IN ESTABLISHING AND MAINTAINING IMPROVED PASTURES ON ACID, INFERTILE SOILS OF TROPICAL LATIN AMERICA

Fenster, W.E.; Leon, L.A.
International Fertilizer Development Center, (IFDC); Centro Internacional de Agricultura Tropical (CIAT).
1978, 49 p.

The Oxisols and Ultisols (soil types) of tropical Latin America have a high phosphorus fixation, so that substantial amounts of phosphorus must be added to satisfy the requirements of the soils and of the plant species which grow in them. The extremely low levels of both total and available phosphorus therefore create a major problem in establishing and maintaining improved pastures on these soils. Because of these constraints, along with the high unit cost of phosphorus fertilizers, alternative methods of managing improved pastures must be considered. This paper considers four economical methods of improving forage production while still satisfying the phosphorus requirements of the plant. These are: (1) selection of plant species that will tolerate relatively low levels of available soil phosphorus; (2) determining rates and placement of phosphorus fertilizers to increase their efficiency, both initially and residually; (3) use of cheaper and less soluble forms of phosphorus carriers; and (4) use of soil amendments to enhance the availability of soil-applied phosphorus. After discussing each of these methods, the authors conclude that long-term, comparative studies need to be conducted with the various phosphate rocks and their low-cost altered products to ascertain if it is feasible to use them in deference to the more soluble but costly phosphorus carriers. Further research is also recommended to determine the effect of added amendments on the availability of applied phosphorus. When these problems have been researched, it should then be possible to make relatively accurate phosphorus fertilizer recommendations for any given pasture management scheme. This will only be accomplished when both plant and soil phosphorus needs are better understood. A list of 11 references (1964–78) in English and Spanish is appended.

AID/ta-G-1218 GTS 931005400

023 PN-AAG-791

THE BANGLADESH FERTILIZER SECTOR

Chuang, Y.H.; Hill, J.M.; Barnett, B.H.
International Fertilizer Development Center (IFDC).
1978, 57 p.

In Technical Bulletin IFDC-T-11

Despite a significant increase since its inception in 1952, current fertilizer use in Bangladesh is far below the recommended rate; and local production and distribution are inadequate to meet domestic needs. This report analyzes current and potential problems of Bangladesh's fertilizer sector and recommends projects and studies to solve them. To meet the challenge of the projected rapid increase in fertilizer use and reduce the burden of government and donor subsidies, the system's capabilities must be better utilized through improved planning, organization, coordination, monitoring, communication, and information development and exchange. Agricultural research and extension are fragmented, resulting in duplicated efforts and inadequate financial, manpower, and facility resources. Besides geographic and climatic factors, fertilizer supply and use are affected by: (1) shortage and irregular availability of fertilizer; (2) lack of coordination on all levels; (3) low incentives for farmer usage; (4) poor communication systems; and (5) shortage or export of skilled extension, technical, and management personnel. Also, as fertilizer use increases, there will be additional needs for port, transportation, handling, storage, marketing, and communications facilities. Recommendations for solving current problems include conducting an organizational study of the entire fertilizer sector and of the Bangladesh Agricultural Development Corp.; developing 5-year supply and demand plans; implementing management training programs; and studying incentives for fertilizer wholesalers, retailers, and farmers. Recommendations for solving potential problems include indepth studies of: government subsidies; building rather than leasing future warehouses; fertilizer use; future P_2O_5 supply strategy; private sector fertilizer wholesaling, handling, and packaging; as well as development of a transportation and warehousing model, and standard fertilizer specifications. A demographic and geographic Bangladesh data list as well as a direct fertilizer subsidy worksheet are appended.

AID/ta-G-1218 GTS 931005400

024 PN-AAG-793

WORLD FERTILIZER SITUATION AND OUTLOOK, 1978-85

Harris, G.T.; Harre, E.A.
Tennessee Valley Authority (TVA), International Fertilizer Development Center (IFDC) and National Fertilizer Development Center (NFDC).
1979, 27 p.

In Technical Bulletin IFDC-T-13, Updated version of World Fertilizer Market Review and Outlook: PN-RAA-230

Recent increases in world food production are largely the result of increased use of fertilizer in the world's primary agricultural regions. The present report, a joint product of the International Fertilizer Development Center (IFDC) and the National Fertilizer Development Center of the Tennessee Valley Authority (TVA), updates a 1974 TVA report. It reviews the current world fertilizer situation and projects the 1978–85 world and regional supply/demand for major fertilizer nutrients. Three types of fertilizer — nitrogen, phosphate, and potash — are discussed in terms of world capacity, production, consumption, supply/demand balances, and regional supply/demand balances. The fertilizer industry is characterized by a cyclical pattern of long periods of oversupply and brief periods of shortages. The following projections were made for 1977–85: (1) world fertilizer production will increase from 98 million nutrient (nitrogen, phosphate, and potash) metric tons (m/mt) in 1977 to 141 m/mt in 1985, with anticipated production in developing countries of 25% by 1985 as opposed to 10% in 1969;

(2) fertilizer consumption will increase from 95 m/mt to over 135 m/mt, with an annual growth rate of 4.6% compared with 6.0% for 1969–77; (3) world ammonia capacity, already overbuilt, will increase by 31 m/mt between 1978 and 1985; (4) nitrogen fertilizer production will increase from 46 m/mt to 72 m/mt, while consumption will increase from 45 m/mt to almost 67 m/mt, with no supply shortage anticipated; (5) due to increases in livestock feeding costs, nitrogen production will shift from traditional producers to areas where low-cost natural gas is available; (6) phosphate fertilizer production will increase from 27 m/mt to 39 m/mt, with consumption expanding from 26 m/mt to 37 m/mt; and (7) potash fertilizer production will increase from 25 m/mt to 31 m/mt, while consumption will increase from 23 m/mt to 32 m/mt, leading to a possible shortage by 1985. The above projections are limited by the unavailability of reliable data from China and the U.S.S.R., two of the world's largest fertilizer producers and consumers. An overview of world fertilizer consumption, patterns of ownership, prices, and a 13-item bibliography (1974–78) are appended.

AID/ta-G-1218 GTS 931005400

025 PN-AAH-228

DENITRIFICATION LOSS OF FERTILIZER NITROGEN IN PADDY SOILS; ITS RECOGNITION AND IMPACT

Watanabe, I.; Mitsui, S.
International Rice Research Institute (IRRI).
1979, 12 p.

In IRRI Research Paper Series, No. 37

After a large nitrogen loss by denitrification in paddy soils was first recognized in Japan in 1941, field studies to minimize this loss were conducted both in Japan and in all rice-growing countries. This paper outlines the history of these studies and their principal results. The paper is divided in two parts. The first part presents an historical review of Shioiri's discovery of the loss of surface-applied nitrogen by denitrification in flooded rice soils and of the consequent Japanese efforts to minimize this loss through deep placement of nitrogen fertilizer. The historical succession of innovations to make deep placement practical and acceptable to farmers, such as deep placement of urea after transplanting or of nitrogen at panicle formation stage, are noted. Also noted are the forms and methods of mechanized deep placement, e.g., the use of nitrogen, liquid ammonia, and liquid fertilizers; and the uses of fertilizer applicators attached to engine-driven cultivators and of band applicators of paste fertilizers attached to an engine-driven transplanter. The second part of the report describes other international and national efforts in these areas, such as deep placement trials with ammonium sulfate, urea, and slow-release nitrogen fertilizers at the International Rice Research Institute; and the joint Food and Agriculture Organization/International Atomic Energy Agency effort to form an international network of fertilizer trials for wetland rice. Studies being undertaken in the tropics on ammonia volatilization loss in association with high pH of floodwater due to algal photosynthesis are summarized, and the implications of recent research for tropical rice farmers (who are still generally reluctant to adopt new methods of application) are discussed. A 30-item list of references (1935–79) is appended.

AID/DSAN-G-0083 931082600

026 PN-AAG-818

ESTIMATION OF CONSUMPTIVE USE OF WATER FOR WHEAT UNDER OPTIMUM MANAGEMENT CONDITIONS

Haidar, G.; Farooqi, M.A.; DeMooy, C.J.
Colorado State University.
1975, 37 p.

Conservation of existing irrigation supplies in Pakistan is becoming more and more important as the demand for irrigation water increases and new sources of supply become harder to find. One of the objectives of the Mona Reclamation Experimental Project is to develop new techniques for on-farm water management. This report is part of that program. Currently, much water is wasted by over-irrigation of crops. A large portion of this water could be saved by applying the exact amount of irrigation water required. Since wheat is one of the most important food crops in Pakistan, it was chosen for study. The test site consisted of a one-acrefield of medium-to-fine-textured, non-saline, non-alkali soil. Final moisture sampling was done at the time of the wheat harvest. The samples were dried in an electric oven at 105°C to constant weight, and the moisture contents were calculated on a dry-weight basis. The consumptive use of water was worked out by two independent methods. The first consisted of gravimetric measurement of soil moisture depletion, in which consumptive use was measured by adding the water loss between soil samplings — i.e., before and after each irrigation, plus pan evaporation for 3 days after each irrigation, plus rainfall, plus evapotranspiration for the days not otherwise accounted for. The second method measured the total quantity of irrigation water applied during the growth period, plus or minus the difference in soil moisture at sowing and harvest time. The study determined that an appreciable amount of water can be saved, without a loss in production, by using no more than 14 inches of water from irrigation, rainfall, and moisture available in the soil. More complete results, in terms of evapotranspiration, consumptive use, and wheat yield, are also discussed. The authors note that the study is still in progress, so that the findings should be used with caution. The report includes numerous charts and a brief bibliography (16 references, 1957–73).

AID/ta-C-1100 931048900

027 PN-AAG-847

IMPROVING IRRIGATION WATER MANAGEMENT ON FARMS: ANNUAL TECHNICAL REPORT, 1978/79

Colorado State University Engineering Research Center.
1979, 650 p.

The irrigation system of Pakistan represents one of the largest modern conveyance systems in the world and is a marvel of engineering skill and technology. There are, however, many problems concerning the farm-level portion of the system. This document reports on the progress of Colorado State University (CSU), contracted under an AID-funded project to assist the Pakistani farmer operate and manage the water from the canal outlet through the irrigated field. Among the most significant CSU accomplishments during this report year were: (1) continuation of field studies, including the watercourse cleaning and maintenance research program; (2) completion of watercourse surveys, including physical and socioeconomic aspects; (3) implementation and evaluation, in conjunction with USAID and the Government of Pakistan (GOP), of the On-Farm Water Management Pilot Project; (4) conducting preliminary field studies and seminars regarding alternatives and the legal framework necessary for organizing farmers to improve on-farm water management practices; (5) preliminary development of training materials and training of Water Management Extension Officers for the pilot project; (6) development of related research proposals; (7) completion of a reconnaissance survey for identifying on-farm water management constraints; (8) successful development of various improved watercourse construction and control devices; (9) cooperative research with the major agricultural research centers in Pakistan pertaining to wheat, rice, cotton, and maize; and (10) development of three major manuals (on problem identification, development of solutions, and project implementation) for transferring the results of this project to other LDCs. As a result of the wide dissemination and utilization of research results, water management research activities have been institutionalized, and the need for improved water laws and codes and for strong incentives encouraging development of farmer organizations for watercourse improvement has been accented. Attached to the report are an annotated list of project publications and 32 appendices describing the results of research performed and evaluating the progress of selected project activities in detail.

AID/ta-C-1411 931048900

028 PN-AAG-964

NORTHEAST RAINFED AGRICULTURAL DEVELOPMENT PROJECT — AN OPPORTUNITY FRAMEWORK

University of Wisconsin.
1979, 97 p.

In Consulting Report No. 2

Exhaustion of the land frontier and the twin risks of crop failure due to weather and price failure due to fluctuating world markets require that new sources of income and productivity be found for farmers in the predominantly rainfed areas of Northeast Thailand. As part of a prefeasibility study for the Northeast Rainfed Agricultural Development Project, this report outlines major strategic and project intervention elements, together with key organizational issues, for development of the region. An initial chapter describes a simple model relating the roles of research, extension, institutional change, and the concept of area development for increasing rural income and productivity. Such increases are seen as depending upon: (1) technological innovations and product/income prices which raise the optimal production level and create a gap which may be filled by farmers; (2) the acquisition of skills and new practices, mainly through extension, to close the gap between what is optimal and what is actual; and (3) institutional changes which promote farmer access to new technology while removing or reducing the risks to its employment. Individual elements of a rainfed agricultural project for the area are discussed next, including systems for upland and paddy crops, water resource management, livestock, fisheries, land tenure, and marketing and processing of major agricultural products. Specific recommendations include improvement of paddy and crop production through the use of azolla as a technique of biological fixation and through the use of direct seeding of photoperiod insensitive varieties timed to flower at the time of optimal soil moisture, and development of appropriately fertilized groundnut as a soil building crop by upland farmers. Preproject activities are also discussed and those requiring immediate attention, such as site selection and the need for accelerated research and field testing of new production techniques, are pointed out. A final section proposes an organizational and administrative framework for ensuring effective project planning, programming, management, and execution. Appended are 20 references on individual points raised in the course of the report.

AID/DSAN-C-0060 493029200

029 PN-AAH-225

SOCIAL ANALYSIS OF POTABLE WATER PROGRAMS

Self, G.D.
1979, 78 p.

Few development projects have a greater potential for directly benefiting the rural poor than water supply improvement projects. The benefits which accrue from potable water projects include improved water quality, quantity, accessibility, and reliability. This paper considers the non-engineering aspects of such projects in an effort to improve site selection and design. Three major issues with regard to water projects are water quality and its proper emphasis, the role of education, and water facilities maintenance. Over the past few decades a wide array of diseases have been grouped together as waterborne or water-related diseases. This has unfortunately led to a misunderstanding of the relationship between water and many infectious diseases. For example, it was once doctrine that diarrhoeal disease was transmitted primarily through water sources. However, recent research has found little evidence to support this thesis. In fact, a number of studies have shown decreases of diarrhoeal disease with increases in water availability — without regard to quality. These studies have also recommended the inclusion of a community education component in all potable water projects. Due to poor hygiene, water that is perfectly safe at the tap is often polluted by the time of consumption. Finally, it is maintenance that often determines the success or failure of water projects. An estimated 35–50% of rural water projects are not functioning 3–5 years later. For the most part, developing countries have tended to emphasize construction, with little thought given to future maintenance or recurrent expenditures. This tendency has been buttressed by a similar lack of attention from international donors. Overall, the author recommends greater emphasis on social analysis (earlier in the project planning stage than is now customary) as well as increased community participation in terms of planning, assignment of financial responsibility (or in-kind services), and maintenance. Report includes an annotated bibliography (18 items, 1964–78), a brief

A safe, readily available water supply is a simple, but critical step in development.

report on A.I.D. experiences in water supply programs, and checklists for social and sector analyses of potable water projects.

AID/ne-C-147-79-5

030 PN-AAH-329

DRYLAND AGRICULTURE IN WINTER PRECIPITATION REGIONS OF THE WORLD: STATUS OF THE TECHNICAL ART

Oregon State University, Office of International Agriculture.
1979, 218 p.

Nearly 600 million hectares of the world's arable crop lands are considered semiarid to arid, receiving less than 500 mm of annual precipitation. Despite the lack of rainfall, these zones are major cereal crop producers as well as being home to approximately 450 million people. This document explores the problems and potentials of dryland agriculture, specifically in the winter precipitation regions of the world, which include Northern Africa, the middle latitude dry climates of Eurasia (Iraq, Syria, most of Asiatic Turkey, and the Iranian Plateau), and northwestern North America. Drylands, however, are not exclusively cereal producing regions, for farming in these regions generally includes livestock production. Thus, it becomes critically important to clarify the underlying physical and economic relationships between cereal and livestock production. For example, incidental forage production (crop residues and weeds) constitutes an important source of feed for livestock during periods when range forage is scarce. Furthermore, improved livestock production has a significant potential for employing laborers during the off-seasons. Trade-offs and conflicts between cereal and livestock production must also be considered — such as the fact that certain production techniques (i.e., clean fallowing) reduce forage for grazing. The authors recommend that future development efforts stress both the interrelationship between crop and livestock production and mitigation of weather-related risks of dryland farming. Perhaps the single most important aspect of dryland farming lies in this interrelationship of interfaced livestock and dryland agriculture. Other topics covered by the report include soil fertility, dryland farming equipment, rangeland resources, range animals, and grazing management. Bibliographies follow each section of the report, with most of the references dating from the mid-1960's through the 1970's. Numerous tables and charts depicting incomes, production levels, prices and average rainfall in the various dryland regions are provided.

AID/ta-G-1221 211(d) 931016200

031 PN-AAH-332

ASSESSMENT OF IRRIGATION ACTIVITIES IN BOLIVIA

Harvatin, J.R.
Devres, Inc.
1980, 53 p.

The use of irrigation in Bolivia is very inefficient. Although approximately two-thirds of the nation's population is engaged in agriculture, production remains at a low level. Traditional production methods, poor management, and lack of capital are primary obstacles to improved productivity. The author of this report made onsite visits to irrigation projects throughout Bolivia, interviewing local farmers as well as project personnel. Irrigation has often had disastrous long-term effects in terms of crop yields and soil erosion. Impinging on the capability of many of these lands to sustain irrigation are such factors as steep slopes, soils susceptible to erosion, shallow soils, limited moisture-holding capacity, rocky soil, salinity, threat of waterlogging, frequent flooding, and adverse climate. Nevertheless, there are strong indications that, with the use of modern soil conservation technology, Bolivian agriculture could significantly benefit from irrigation. Steep slopes can be benched, terraced, and corrugated for close-growing crops, etc. However, land capability should be carefully considered in the future selection of irrigated projects. Data should be collected on streamflow, surficial storage, and underground waters. Realistic and meaningful cost/benefit studies should be prepared for all projects. Overall, there is a critical lack of trained personnel, tools, and equipment for current irrigation activities. The author recommends that a concentrated effort be made to intensify the Government of Bolivia's (GOB) education and extension services, focusing on basic farm management, production techniques, irrigative water management, and soil conservation. The frequent use of irrigation water contaminated with raw sewage poses a significant health hazard. The GOB should be encouraged to implement meaningful water laws. Current irrigation activities are being carried out by several different institutions. These institutions should be consolidated, and an effective irrigation authority established to provide national policy and administrative and technical direction.

AID/SOD/PDC-C-0223 511000001
Also available in Spanish: PN-AAH-333, 44 p.

032 PN-AAH-422

THE PROCESSES OF DESERTIFICATION AND THE CHOICE OF INTERVENTIONS

Jodha, N.S.
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
1979, 18 p.

In Economics Program, Progress Report No. 2

The arid zone of Rajasthan currently accounts for nearly 63% of the tropical arid areas in India, and is expanding. This paper, published by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), examines the process of desertification in that zone. This process includes the loss of top soils, submersion of fertile lands under shifting sand dunes, appearance of saline wastelands, drying of dug wells or increased salinity of well waters, replacement of superior perennial grasses by inferior species, reduced crop productivity, and the eventual outmigration of people and animals. This region's primary resource is grazing land, with only a few areas capable of sustained cropping. As a result, a system of mixed farming (crop and livestock production) has evolved and is increasing. However, this increase in mixed farming has led to the cultivation of lands suited only to natural grasses and to the overstocking of fast-shrinking grazing spaces. A lessening of the physical and market isolation of the region (primarily through road construction) has accelerated the adoption of mixed farming — with two major implications: First, while making possible immediate assistance to inhabitants during periods of drought, every intervention (however well-intentioned) has sowed the seeds for a further, more serious crisis by increasing pressure on the resource base without strengthening the base itself; secondly, increased access to markets has spurred farmers to continue over-cultivation of nearly exhausted lands. In addition, land reforms of the 1950's inadvertently contributed to the desertification of the region by abolishing feudal taxes and penalties for the use of some lands and by placing more areas under cultivation. Reversal of this resource-exploitation process should begin by neutralizing the factors listed above — both through the use of technology (stabilization of shifting sand dunes, reseeding, construction of ridges and contour trenching, creation of shelterbelts and microwind breaks, and instituting moisture-conservation measures) and the adoption of tax incentives and disincentives to encourage conservation. A bibliography of 25 entries is appended (1964–78).

AID/ta-G-1421 931097200

033 PN-AAH-500

THE IMPACT OF GROUNDWATER DEVELOPMENT IN ARID LANDS: A LITERATURE REVIEW AND ANNOTATED BIBLIOGRAPHY

Keith, S.J.
Arizona University, Office of Arid Lands Studies.
1977, 149 p.

In Arid Lands Resource Information Paper No. 10

As groundwater development is increasing, it is imperative to anticipate the cultural impacts of its development. This paper reviews the literature on the physical and socioeconomic effects of groundwater development in arid lands and presents a related annotated bibliography of 188 entries (1935–77). As a whole, this literature only scratches the surface of its topic. The author notes that most of it addresses only the negative physical impacts, and disregards the socioeconomic and beneficial aspects of groundwater development. Literature on the environmental effects of groundwater development describes the use of groundwater for irrigation and livestock production and the response of the aquifer to groundwater pumping. The latter includes topical discussions of the impact of wells on spring and groundwater flow, vegetation, drainage, groundwater quality, and topography. In regard to the socioeconomic impact of groundwater development on health and cultures, two case studies are presented. That of the Papago Indian illustrates the cultural and subsequent environmental changes occurring when an assured groundwater supply is developed within an area of previous water scarcity, inhabited by a nomadic people. In the case of Pakistan, it is demonstrated that groundwater development can play an important role in the economies of arid, developing countries. In general, groundwater development can cause considerable environmental and social change. The former includes deterioration of groundwater quality; subsidence, fissuring, and faulting of the land surface; changes in erosional regimes; destruction of vegetation; and decline of spring and stream flows. Cultural changes are most dramatic when groundwater development is undertaken in nomadic economies. Both the physical and socioeconomic impacts of groundwater development depend ultimately, however, upon the amount and rate of water withdrawal, and are influenced by the cultural-institutional setting which dictates the response to groundwater development, how water is used, what is permissible, and what is economic.

AID/ta-G-1111 211(d) 931015900

034 PN-AAH-588

EVALUATION AND IMPROVEMENT OF IRRIGATION SYSTEMS

Peri, G.; Skogerboe, G.V.
Colorado State University, Engineering Research Center.
1979, 99 p.

In Water Management Technical Report No. 49A

Inefficiencies in water delivery and irrigation practices in LDC farming may lead to lower yield per unit of area and per unit of water, less total area irrigated, and detrimental environmental effects, as well as to lower returns from the irrigated crops. This report suggests a comprehensive procedure for evaluating and improving LDC irrigation systems. The procedure is based on the analysis of the performances of the system for an individual application (a single episode of applying water), along with the irrigation management regime (intervals and depths of application), resulting in an analysis of the whole irrigation season. The report follows a similar format. Performance evaluation of an individual irrigation application is based on the water distribution profile after irrigation. Efficiencies and coefficients that describe the irrigation are derived directly from the water distribution profile. Based on these efficiencies, the irrigation performance can be determined and classified into the appropriate performance categories. The seasonal irrigation regime parameters can be determined on the basis of given yield functions and yield and irrigation costs, so that desirable levels of application intervals and depths can be obtained. The overall irrigation season can therefore be quantified by parameters affecting the water distribution profile (distribution uniformity and delivery, deep percolation, and storage efficiencies) and by those influencing the extent of the irrigation season (marginal water costs, yield-water economic relations, crop water use efficiency, and yield per unit of area). In addition, environmental and economic inputs are important in quantifying the overall and seasonal levels of performance. Although the levels of these parameters can all be directly determined for evaluating overall crop yield performance, the performance of the irrigation regime and of the individual application should be considered for improvement decisions. A list of 61 Water Management Technical Reports available from Colorado State University and a bibliography of seven references specific to this report (1967–78) are included.

AID/ta-C-1411 931048900

035 PN-AAH-589

EVALUATION AND IMPROVEMENT OF BASIN IRRIGATION

Peri, G.; Skogerboe, G.V.; Norum, D.I.
Colorado State University, Engineering Research Center.
1979, 199 p.

In Water Management Technical Report No. 49B

Surface irrigation methods can be classified into two major groups, flood irrigation and furrow irrigation. Flood irrigation methods differ because of slope, discharge, and field size (basin, border strip, border ditch, etc.). This report outlines a procedure for the design and evaluation of basin irrigation systems. The first section describes the general characteristics of basin irrigation, showing the interactions between the various basin characteristics, and the operational, management, and performance parameters. The second chapter presents a field evaluation of water distribution patterns for basins where water distribution is irregular. Possible methods for estimating the distribution pattern and evaluating irrigation performance include direct field depth estimations, recession pattern measurement, the excess application method, and the ponded water method. Theoretical water distribution models, which are the subject of the third chapter, can be developed and used only for regular basins with certain characteristics. A general model is discussed by considering the various functions upon which it must be based (infiltration, advance, recession). A simplified model applicable to both level and sloped basins is also presented. These models allow the prediction of the water distribution and water performance, but some field tests are still necessary for control purposes. The fourth chapter deals with the use of water distribution models for improving irrigation. Methods differ for regular and irregular basins. Various case studies are presented here for improving irrigation performance in regular basins, utilizing the results of the simplified model. The final chapter presents the method for improving basin irrigation by land preparation, which becomes necessary with irregular basins. Appended to the report are a field evaluation of the infiltration equation for basin irrigation, a list of 61 Water Management Technical Reports available from Colorado State University, and a bibliography of 33 references specific to this report (1946–78).

AID/ta-C-1411 931048900

036 PN-AAH-590

EVALUATION AND IMPROVEMENT OF BORDER IRRIGATION

Peri, G.; Norum, D.I.; Skogerboe, G.V.
Colorado State University, Engineering Research Center.
1979, 121 p.

In Water Management Technical Report No. 49C

Border irrigation is a method of controlled surface flooding involving a rectangular field bounded by dikes along its longer dimension to restrict the lateral flow of water. This report is concerned with the evaluation and improvement of the graded border type in which there is a gentle and uniform slope in the direction of irrigation. The general characteristics of border irrigation are dealt with first, including the water distribution pattern and the general relationships between the border irrigation results and operating conditions. The second chapter deals with evaluation of border irrigation based on field tests. This requires the estimation of the infiltration equation and the advance and recession for specific inlet stream and border parameters (slope, length, surface). Shutoff time and inlet stream size give the total quantity of water delivered into the border, evaluation of the quantity of water absorbed requires measurement of the runoff, and determination of the water quantities in terms of depths requires the measurement of the dimensions of the border. A lengthy description of how this data is utilized in such evaluations is included. The third chapter deals with the improvement of border irrigation performance by field tests. Improvement of irrigation performance is related to changes in inlet unit stream size, cutoff time, and length of the border, since changing the slopes, surface roughness, and infiltration is generally impractical. The last chapter deals with theoretical border irrigation models which allow evaluation and improvement of irrigation performance requiring only limited amounts of preliminary field work. The input data required for the several different models available include infiltration data; border slope, length, and surface roughness; inlet stream size; and cutoff time. These models are described, as are the processes for applying them. A list of 18 available border irrigation models, a bibliography of 20 references specific to this report (1965–79), and a list of 61 Water Management Technical Reports available from Colorado State University are also included.

AID/ta-C-1411 931048900

037 PN-AAH-591

IRRIGATION AND HONOR: CULTURAL IMPEDIMENTS TO THE IMPROVEMENT OF LOCAL LEVEL WATER MANAGEMENT IN PUNJAB, PAKISTAN

Merrey, D.J.
Colorado State University, Engineering Research Center.
1979, 61 p.

In Water Management Technical Report No. 53

Inadequate organization of irrigation water users is now recognized as the major constraint to improving on-farm water management in Pakistan. This report, based on a detailed study of one village, describes a major theme in Punjabi culture — the concept of "izzat", meaning honor or reputation, and how this relates to irrigation. After a brief introductory section, a summary of the sociological findings of the village study is presented. The central mobilizing social unit at the village and watercourse level is the "biraderi" (brotherhood). Communities characterized by two (or more) large biraderis of agriculturalists of about equal size and power will exhibit a greater tendency toward polarization, and therefore will be more difficult to organize for collective projects. The third section contains a discussion of the concept of culture, and how the rules and standards of a group of people may affect the success of a newly implemented form of organization. Next, a case study of an experimental attempt at carrying out village-level watercourse improvement in Pakistan is presented. The concept of izzat and its implications for establishing local level organizations are then explained. The concern for preserving or increasing one's izzat, or reducing others' izzat, generates conflict and competition among people and discourages cooperation. Given the sociocultural characteristics summed up in the concept of izzat that seem to prevent rural Punjabis from organizing and cooperating, a three-pronged strategy is suggested in an attempt to foster badly needed local watercourse improvement and maintenance initiatives: (1) establish legal and administrative mechanisms to facilitate organization; (2) build in rewards to attract farmers to organize and then maintain cooperative watercourse efforts; and (3) apply sanctions to individuals and groups who sabotage organizational efforts and to local communities who lag behind in such organization. A list of 61 Water Management Technical Reports available from Colorado State University and a 33-item bibliography of references specific to this report (1963–79) are included.

AID/ta-C-1411 931048900

038 PN-AAH-592

ORGANIZATIONAL PROBLEMS AND THEIR CONSEQUENCES ON IMPROVED WATERCOURSES IN PUNJAB

Mirza, A.H.; Merrey, D.J.
Colorado State University, Engineering Research Center.
1979, 207 p.

In Water Management Technical Report No. 55

Based on an intensive survey of 10 improved watercourses in Punjab, Pakistan, this study shows the inadequacy of present forms of social organization of watercourses for ensuring their adequate maintenance. The first chapter discusses the study's objectives, its theoretical background, and the hypotheses guiding the research. Chapter two presents basic sociological background data on ten sample watercourses and proposes criteria for predicting the likelihood of success of an improvement project on particular watercourses. Chapter three discusses the process of watercourse improvement, including conflict and cooperation patterns, functioning of "watercourse committees", relationships among farmers and On-Farm Water Management(OFWM) Pilot Project personnel, participation of shareholders in the project, and farmers' perceptions of the effects of improvement. Chapter four focuses on the quality of watercourse maintenance and how this is affected by various sociological characteristics of the watercourse, while chapter five discusses sample farmers' reactions to the idea of establishing Water User Organizations. The final chapter summarizes the study's findings, discusses their implications, and makes recommendations both for immediate use by the OFWM Project and for further research in actively organizing experimental water user organizations. The study suggests the following sociological characteristics as conducive to good watercourse maintenance: (1) a large percentage of landholdings in the 6.5–25 acre range; (2) relatively equal distribution of power and influence among a large number of farmers on the watercourse; (3) relatively high levels of institutional services available; (4) previous history of cooperation; and (5) a small number of watercourse shareholders. The authors encourage the OFWM personnel to strive for maximum possible farmer participation in the project and to try out new ideas in water management. A design for further research is also outlined. A list of 64 Water Management Technical Reports available from Colorado State University and a 20-item bibliography specific to this report (1965–79) are also included.

AID/ta-C-1411 931048900

039 PN-AAH-593

OPTIMIZATION OF LENGTHS OF ALTERNATIVE WATERCOURSE IMPROVEMENT PROGRAMS

Reuss, J.O.
Colorado State University, Engineering Research Center.
1980, 61 p.

In Water Management Technical Report No. 57

In Pakistan, some 80,000 watercourses serving over 30 million acres operate on a fixed rotation basis in which water is delivered for a fixed time to successive outlet points along the channel. Heavy losses of water occur along these channels, and this has been identified as a major Pakistani development problem. This report puts forth a sound theoretical basis and develops computational methods for choosing between the alternative methods of construction or improvement of such watercourse systems. This task is made difficult by the fact that various sections of these systems will have vastly different use times, and these differences in utilization markedly affect the benefits derived from lining or other improvements on any particular section. After a brief introductory section, four theoretical considerations for evaluating alternatives (the linear loss assumption, nonlinear loss assumptions, the branched watercourse case, and distribution of benefits) are presented. The factors considered in the analyses as controlling the selection of an improvement or construction method include the annual cost per unit length, the expected water loss associated with each alternative, and the value of the water. Computational methods are developed for determining the optimum points for changing lining methods, and for quantifying benefits of improvement accruing to users throughout the system. The main body of the text concludes with discussion of these theoretical considerations and conclusions. The first major conclusion is that, depending on use time, net benefits are generally maximized when different construction methods, such as concrete lining and earthen improvements, are applied to various sections. Secondly, the major beneficiaries to improvement of high use sections are the downstream users that may be located on reaches where high cost improvements may not be economically feasible. A list of 66 Water Management Technical Reports available from Colorado State University and an 8-item bibliography of references specific to this report (1974–79) are also included.

AID/ta-C-1411 931048900

040 PD-AAC-100

EVALUATION OF THE KENYA NATIONAL RANGE AND RANCH DEVELOPMENT PROJECT

Axinn, G. H.; Birkhead, J. W.; Sudholt, A. W.
Devres, Inc.
1979, 179 p.

A multidonor project designed to increase the quantity and quality of livestock production in Kenya was initiated in 1974. This in-depth study evaluates the A.I.D. portion of that project. The multidonor project was designed to develop ranches, feedlots, rangelands, and wildlife areas, as well as to expand market facilities and provide technical services and training. A.I.D. financing was limited to equipment and support services for rangeland development, cattle purchases for the ranching program, and a meat processing feasibility study. After an introduction concerning the project purpose and history and the evaluation strategy, the report continues with a detailed discussion of the project's design and component parts. Subsequent sections evaluate the effectiveness and appropriateness of A.I.D. inputs and the progress achieved in the livestock marketing area. Next, the environmental impact and sociological effects of the project are discussed. Finally, a review of current planning and some thoughts for the future are included. The evaluation team found that although some project achievements have been outstanding, they often fell short of unrealistic project goals. Especially disconcerting were the unrealistically short time frame allowed for goals to be reached and the absence from the plans of contingency provisions in the event of a drought. Among the positive project consequences were the sensitivization of technicians, financiers, planners, and international donors to the realities of a fragile environment and the reduction of friction between tribal clans. Some 39 recommendations were made concerning general project design and strategy; economic, ecological, and sociological considerations; and project implementation, including the interesting conclusion that, although the expansion of cattle production over the short run should be fostered by permitting cattle prices to rise, it is not in the long-term interest of the people of Kenya to increase present livestock numbers. An executive summary, 17 annexes, and an 89-item bibliography (1961–79) are also included.

AID/AFR-C-1558 615015700

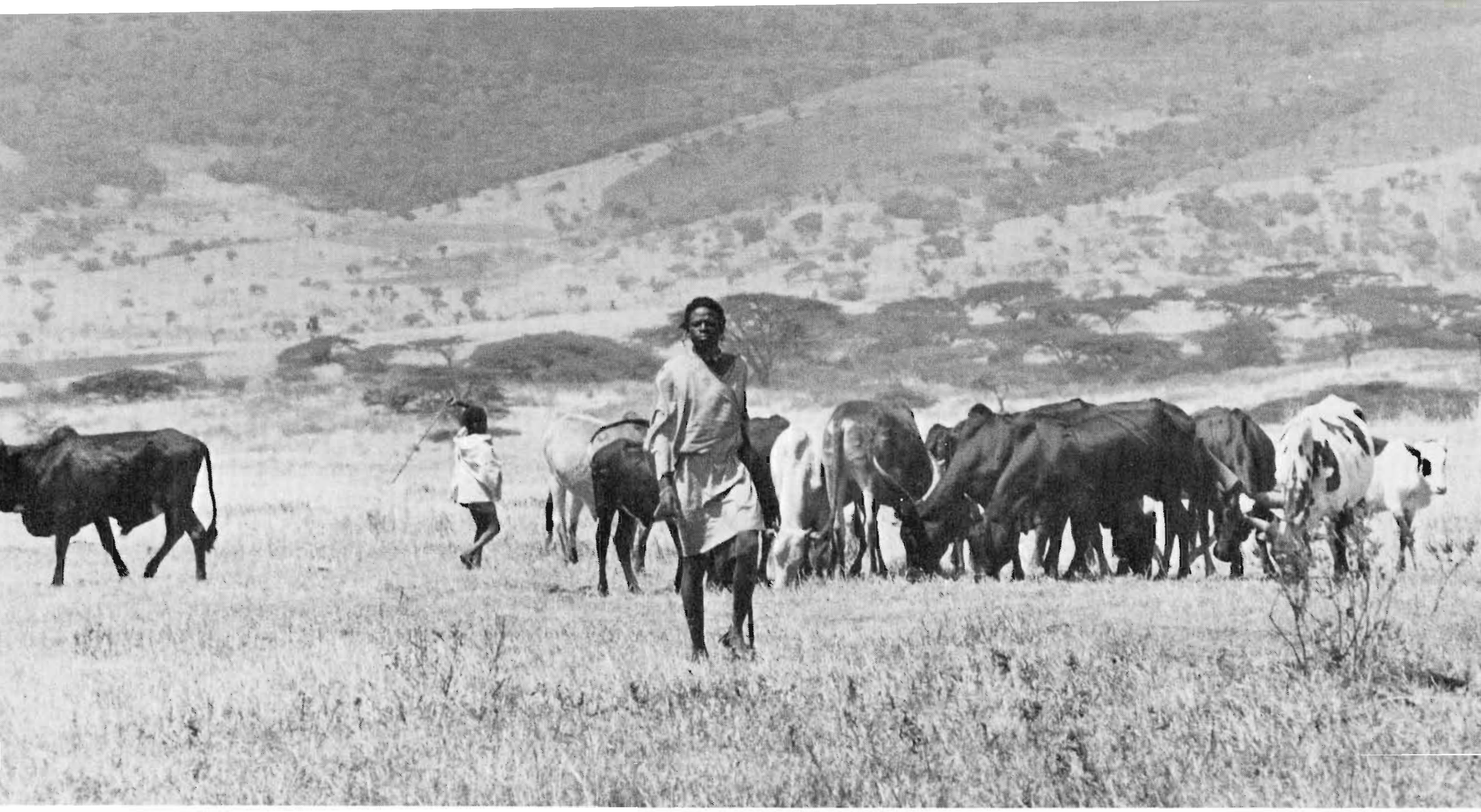
041 PN-AAG-756

EVALUATION OF THE PRODUCTIVITIES OF MAURE AND PEUL CATTLE BREEDS AT THE SAHELIAN STATION, NIONO, MALI

International Livestock Center for Africa (ILCA).
1978, 110 p.

In ILCA Monograph No. 1

From 1966 to 1975, the Sahelian Station at Niono, Mali, maintained substantial herds of two typical African breeds of Zebu cattle, the Maure and the Peul, together with their crosses, in order to collect comparative data in the areas noted below. This report is an analysis of these data performed by the International Livestock Center for Africa. The animals were kept for milk and meat produc-



Masai livestock graze on Tanzania's rangelands.

tion and for draft purposes. They were maintained by improved management practices such as supplementary feeding, controlled breeding, and veterinary care. An introduction describes the animal production system at Niono, together with the preparation of the data for analysis and the analytical method used. Research results are then presented in regard to reproductive performance and productivity; milk yield and composition; mortality; body weight; maternal ability; and linear measurements. No breed differences are found in terms of age at first calving, the calving interval, butterfat levels, and mortality rates. The Maure and the Maure/Peul crossbreed are 13% superior to the Peul in annual total milk yield. Breed differences in growth rates suggest that Maure and Maure/Peul crossbreed dams provide a 7% superior maternal environment as compared with Peul dams. Cow productivity estimates indicate that the average cow produces 418 kg milk/year; 0.68 of a weaner calf weighing 54.4 kg; and 47.4 kg of its own final live weight. Over its 10-year lifetime, each cow produces 2,717 kg milk; 4.4 weaner calves weighing 354 kg; and 308 kg of disposable body weight. The Maure is 13% superior to the Peul in cow productivity, and the Maure/Peul crossbreed is 2% superior to the Maure. Analysis results are compared with related data of known production systems in African environments comparable to that of Niono. Initial results have pinpointed many gaps in individual trait values, but further research is needed to fill gaps before productivity comparisons can be meaningfully constructed. Appended is a 40-item bibliography of English, French, and German language report-related titles (1947–76).

AID/ta-G-1497 931031100

042 PN-AAH-219

SWINE PRODUCTION SYSTEMS: AN EXPLORATORY ANALYSIS OF RESEARCH PROBLEMS AND ALTERNATIVES IN SELECTED COUNTRIES OF TROPICAL LATIN AMERICA

Nores, G.A.; Gomez, G.
Centro Internacional de Agricultura Tropical (CIAT).
1979, 33 p.

Swine production in Latin America is very inefficient. While the swine population in that region represents 11% of the world's total, it actually produces only 4.6% of that total. The region's low productivity has been attributed to a group of interrelated factors, the most critical of which is generally agreed to be the lack of quality feed for efficient swine nutrition. The present study was undertaken to explore this hypothesis and to determine if and what types of research and training programs would help to alleviate the problem. Representative examples of swine production systems in Bolivia, Colombia, Ecuador, Guatemala, and Paraguay were selected for study. Analysis of swine production and of per capita production of energy and protein sources revealed that during 1960–76 there was no apparent improvement in swine productivity and that this low productivity is attributable to the low availability of feedstuffs (absolute deficit) and the relatively low availability of protein (relative protein deficit vs. calories) available for swine nutrition. In addition, analysis of swine production systems revealed that swine production in these countries is for the most part closely linked to the overall farm systems of which these operations form a part. Recommended are: (1) further research on the characteristics of the most relevant production systems in terms of the availability of and access to production factors, including management capacity for incorporating new technology, the opportunity cost of their resources, and the role of swine activities within the farm systems; (2) development and adaptation of technology applicable to the small production strategy; (3) research on the development of high quality protein sources (maize and sorghum), grain legumes (soybeans, cowpeas, and peanuts) and forage legumes specifically adapted to the region's environment; and (4) evaluation of the performance of native breeds and cross-breeds under the subfeeding conditions prevalent in existing production systems. The training of professionals to strengthen swine research and development programs at the regional level is also recommended. Fourteen pages of illustrative tables and charts accompany the report.

AID/DSAN-G-0076 931086500

043 PN-AAH-238

REPORT OF THE WORKSHOP ON PASTORALISM AND AFRICAN LIVESTOCK DEVELOPMENT, HARPERS FERRY, WEST VIRGINIA, 1979

Institute for Development Anthropology (IDA).
1979, 86 p.

During three days in September 1979, the AID-sponsored Workshop on Pastoralism and African Livestock Development was held in Harpers Ferry, West Virginia, attracting some 80 participants from a variety of countries, organizations, and specialties. This group examined the principal social, economic, and environmental assumptions which underlie livestock sector interventions in semiarid regions of Africa. The positions advanced in this report emerged from the discussions and presentations at this workshop. The report begins with a section on conclusions. There was a general consensus at the workshop that, if livestock sector programs and projects are to have favorable and beneficial impacts on producer populations, national wealth, and environmental conditions, they must be reoriented to make them more compatible with the social, economic, and environmental realities of African arid and semiarid pastoral regions. A set of general principles were generated which may serve as a tentative guide for action in this area: (1) quantitative data relating to pastoral systems are notoriously unreliable; (2) management units for development interventions in the livestock sector should be small-scale and based on existing cultural-ecological systems; (3) various kinds of mobility are both crisis-survival mechanisms and effective strategies for long-term exploitation of the range; (4) semiarid rangelands can experience considerable biological and climatic stress without necessarily resulting in long-term degradation; (5) the prime emphasis on livestock sector interventions at this time should be to support the subsistence base of pastoral herding rather than to use commercial activities; and (6) monitoring and evaluation should be made integral components of every program and project in the livestock sector. Included in the report are summaries of the workshop discussions, which covered: range degradation and productivity, program and project objectives, institution building, marketing, case studies, and implications for policy, programs, and project design. Appendices listing the participants, outlining the agenda, and indicating the result of a participant questionnaire distributed in advance are also included.

AID/otr-G-1741 930004700

044 PN-AAH-563

SMALL RUMINANT PRODUCTION IN THE HUMID TROPICS

International Livestock Center for Africa (ILCA).
1979, 127 p.

In ILCA Systems Study, No. 3

In 1978, the International Livestock Center for Africa conducted an extensive literature review and a survey mission to four West African countries — Ivory Coast, Ghana, Togo, and Nigeria — concerning small ruminant production in the tropics. The main constraint on the production of these animals is the high incidence of disease, although veterinary knowledge and treatment have already been developed which could substantially alleviate this problem. Therefore, this study focuses on the more effective application of existing knowledge to traditional production systems. The study begins with a background section, describing the climate and ecology, population and livestock numbers, and crop and livestock production in the tropics of West and Central Africa. Information concerning the genetic resources and production parameters of breeds of dwarf sheep and goats in these areas is then presented, along with strategies for genetic improvement. Next, the reproductive performance of sheep and goats is discussed, followed by a treatment of animal nutrition and tropical forages. The latter section concludes with an estimate of potential livestock production based on tropical pastures. The fifth chapter examines fodder production in the region, since intensified fodder production systems will be required as improved management and disease control increases the number of small ruminants. The sixth section discusses a substantial resource for supplementary livestock feeding, namely the abundant and varied agroindustrial byproducts present. Chapter seven deals with housing to protect the animals from rainfall and heat. Animal health is treated next, in terms of different diseases, parasitic infestations, and other animal health problems. Following this, the wider economic considerations involved in goat and sheep production in the humid zone are discussed. The economic efficiency of small ruminant production is considered from the perspective of the individual farmer and of the national economy. Finally, proposals for further research are summarized. An appendix of livestock data and a 223-item (1942–79) bibliography of French and English language references are also included.

AID/DSAN-C-0081 931031100

045 PN-AAH-564

LIVESTOCK PRODUCTION IN THE SUBHUMID ZONE OF WEST AFRICA: A REGIONAL REVIEW

International Livestock Center for Africa (ILCA).
1979, 184 p.

In ILCA Systems Study, No. 2

The subhumid zone of West Africa, which includes portions of Senegal, Guinea-Bissau, Guinea, Sierra Leone, Mali, Ivory Coast, Upper Volta, Ghana, Togo, Benin, Nigeria, and Cameroon, represents a valuable agricultural resource. The zone's abundant grass cover provides a rich potential for forage and grain production, but remains underexploited, with a relatively low human and livestock population. The zone's most important climatic feature is its total annual mean rainfall, which ranges from 1,000 to 18,000 mm. Thus, rainfall in this zone tends to be more reliable and the ecosystem less fragile than in the arid areas to the north, where large-scale cattle production has traditionally been focused. If the risk of trypanosomiasis can be reduced or removed, livestock production could be substantially increased. This report is based on the results of a symposium held in Kaduna, Nigeria in March 1979, cosponsored by the International Livestock Center for Africa and the National Animal Production Research Institute. Major topics discussed in the report include the zone's environmental features, its primary livestock producers (the Fulani pastoralists), fodder resources and management, livestock resources and management, animal health, tsetse-transmitted trypanosomiasis, land use and development strategies, and future research. Two types of development are envisaged for this zone. On arable land, mixed farming systems could be developed, integrating livestock and crop production; in areas which are too dry (or otherwise unsuitable for cropping), livestock production would continue to be based primarily on natural pastures, with a gradually increasing emphasis on meat production. Future research should emphasize the monitoring of rangeland vegetation, basic information on the livestock production system of the pastoralists, information on sheep and goat production, efforts to determine the effects of subacute trypanosomiasis, as well as a precise demarcation of tsetse populations. A 31-page bibliography is provided (1900–77). A significant number of the publications are in French.

AID/DSAN-G-0081 931031100

046 PN-AAG-678

COLORIMETRIC ENZYME-LINKED IMMUNOSORBENT ASSAY FOR THE IDENTIFICATION OF STRAINS OF "RHIZOBIUM" IN CULTURE AND IN THE NODULES OF LENTILS

Berger, J.A.; May, S.N.; Berger, L.R.; Bohlool, B.B.
United States Department of Agriculture, Science and Education Administration.
1979, 5 p.

In Applied and Environmental Microbiology, Vol. 37, No. 3, 1979, pp. 642-646

An indirect enzyme-linked immunosorbent assay (ELISA) has been developed to identify strains of *Rhizobium* in culture and lentil nodules. This paper describes this colorimetric method, which was developed to meet the need for serological assays which are rapid and do not require elaborate or expensive equipment. After a general overview of the research accomplished, the materials and methods used to develop the ELISA are described. Basically, the test uses strain-specific rabbit antisera, sheep anti-rabbit globulin (SARG) conjugated to alkaline phosphates, culture and root bacteria, and immunofluorescent staining methods. In the ELISA tests bacteria from either culture or nodule, are first coated with a specific rabbit anti-*Rhizobium* serum and then with sheep anti-rabbit antibodies covalently linked to alkaline phosphates. A chromogenic substrate is then applied to the antibody smear, and the color is measured after a period of incubation. The amount of colored product is proportional to the amount of enzyme present, which in turn is indirectly related to the quantity of antigen on the slide. The ELISA is endowed with the specificity of antigen-antibody reactions and the sensitivity of enzyme-catalyzed reactions. Initial problems were encountered with the SARG conjugate adsorbing nonspecifically to rhizobial cells, but this was countered by pretreatment of the cells with bovine gamma globulin. The specificity of the ELISA was not lost when nodules, together with their bacterial content, were subjected to freezing or boiling. In cases where only a few strains of *Rhizobium* are to be studied, a faster, less sensitive direct ELISA may be used. Finally, the importance of this development is discussed. In every case, complete agreement was obtained between the ELISA tests and direct immunofluorescence tests used for confirmation. The former, therefore, enjoys the specificity of the latter, without requiring large amounts of antisera, microscopes, and a large central laboratory. Appended to the paper is an 11-item bibliography (1964–77) of literature cited.

PA/AG/TAB-610-9-76 931061000

047 PN-AAG-828

DEVELOPMENTS IN THE CONTROL OF POTATO VIRUSES: REPORT OF THE CIP PLANNING CONFERENCE, LIMA, PERU, NOV. 14-18, 1977

International Potato Center (CIP).
1977, 190 p.

The International Potato Center (CIP) is a non-profit research institution established by agreement with the Government of Peru and dedicated to developing and disseminating knowledge on use of the potato as a basic food. This report presents the proceedings of the fourteenth planning conference on developments in the control of potato virus diseases, held at CIP in Lima, Peru, 11/14-18/77. Eighteen international experts attended the conference to assist in developing a 5-year plan of action, including identification of priorities, for potato virus research. Sixteen papers written by conference participants concerning virus resistance, virus properties, virus testing, antiserum production, histological staining methods, methods for breeding virus resistant potatoes, virus detection, and plant virology, are presented. Major recommendations included the following: (1) breeding for resistance should have the highest priority in attempting to control potato virus diseases; (2) since reliance on the outcome of one testing procedure creates unacceptable risk, different and complementary methods like serology, electron microscopy, and the study of indicator plants, should be utilized; (3) the greatest research effort must be directed to improving and applying new developments; (4) potato virus research should include vector research and should focus on the use of botanical seed to produce crops on a farm scale; (5) pilot tests are needed to evaluate the use of cross protection as a short-term temporary solution to PLRV and PVX-PVY infection-related problems, the possible importance of DNA sequences in *Solanum* species complimentary to PSTV-RNA, and the possibilities of hybridization of *Solanum etuberosum* to make use of PLRV immunity present in this species; (6) additional greenhouse facilities with environmental control possibilities should be provided for testing programs; (7) a 5-year review of the tentative status of the serologist is needed; and (8) high priority work can be accomplished only by a group of approximately five competent researchers. A list of conference participants, their prioritized recommendations, and the conference's agenda are included.

AID/ta-G-1271 931097300

048 PN-AAH-207

IMPORTANT DISEASES AND PESTS OF BEAN ("PHASEOLUS VULGARIS"), LIMA BEAN ("PHASEOLUS LUNATUS") AND PIGEON PEAS ("CAJANUS CAJAN") IN AFRICA

Kaiser, W.J.
United States Department of Agriculture, Agricultural Research Service.
1976, 6 p.

In African Journal of Plant Protection, Vol. 1, pp. 97-102

Bean (*Phaseolus vulgaris*), lima bean (*Phaseolus lunatus*), and pigeon pea (*Cajanus cajan*) are important food crops which provide a major source of protein in the diets of inhabitants of countries of Africa south of the Sahara. Diseases and pests contribute to erratic, low yields and the general poor quality of these legumes in the region. This study identifies important diseases and pests affecting those legumes together with known control methods. Beans are planted in an estimated 1,500,000 hectares in eastern Africa with an average yield of 500–750 kilograms per hectare. Numerous diseases affect beans in Africa including anthracnose, rust, angular leaf spot, halo blight, common bacterial and fuscous blight, and common mosaic virus. Insects are also a hazard. Most of these diseases are transmitted by seed, except rust which is transmitted by wet, humid weather conditions. Effective controls include the use of pathogen-free seed, crop rotation, disease-resistant varieties, and application of chemicals. Lima beans are infected by many of the diseases which plague beans as well as by *Ascochyta phaseolorum* which affects foliage. Also, white fly-transmitted viruses are problematic. These viruses can be controlled by planting of clean seed and chemical application. Pigeon peas are a drought-resistant crop cultivated on soils of low fertility. Important diseases of this crop are wilt, rust, powdery mildew, and nematodes as well as foliage, stem, root, and seed diseases. White fly- and mite-transmitted viruses are also a problem. Pests, such as the American bollworm and cowpea bruchids, are the most important factor limiting the yield and quality of pigeon peas in Africa. These can be controlled by applying insecticides. The report includes various references to books and articles on pests and diseases. A 38-reference bibliography covering the period 1939–75 is appended.

PA/RA(AJ)-03-00 RES

049 PN-AAH-208

NOTES ON EAST AFRICAN PLANT VIRUS DISEASES: II. ALFALFA MOSAIC VIRUS

Kaiser, W.J.; Robertson, D.G.
United States Department of Agriculture, Agricultural Research Service.
1976, 8 p.

In East African Agricultural and Forestry Journal Vol. 42, No. 1, pp. 47-54

Alfalfa mosaic virus (AMV) was isolated from naturally infected lucerne (alfalfa) in Tanzania and potato in Kenya. This was the first record of AMV from East Africa. This article reports on the isolation methods used and on follow-up studies conducted to investigate the virus' properties, including host range and transmission methods. Plants were grown in steam sterilized soil in glasshouses at 15-25° C. Insects were controlled by use of 20% Vapona resin strips and pesticide sprays with wide spectrum insecticides. The lucerne isolate was maintained in *Nicotiana clevelandii* gray and the potato isolate in *Nicotiania tabacum* "White Burley". Sap from systematically infected leaves was used for host range, physical property, purification and serological studies. Host range studies were made by manual inoculation with sap extracted from AMV infected leaf tissue. The leaves of the test plants were previously dusted with carborandum, and rinsed with water immediately after inoculation. Plants that did not develop symptoms were tested for latent infection by back inoculation to bean cv. Long Tom. Physical properties were determined with crude infective sap of *N. clevelandii* and clarified sap of *N. tabacum* for the lucerne and potato isolates. Vector transmission studies were conducted using *Aphis craccivora Koch, Macroisphum euphorbiae* and *Myzus persicae Sulz*. These were starved for two hours and then given test feedings. Plants were then immediately sprayed with an aphicide. Leaves of *N. clevelandii* systematically infected with the lucerne isolate were homogenized in phosphate buffer, and centrifuged, made into pellets, and centrifuged again in the phosphate buffer. This was done to purify the virus. An antiserum was prepared by injecting rabbits intravenously with a partially-purified lucerne isolate and later with an intramuscular injection. A few days later they were injected again. Rabbits were bled 28 days later. Results of this study were that the lucerne isolate affected plants in 29 genera from 7 families while the potato isolate infected 27 genera in 7 families. An 8-item bibliography (1956–76) is appended.

PA/RA(AJ)-03-00 RES 618065700

050 PN-AAH-209

INSECT TRANSMISSION OF PATHOGENIC XANTHOMONADS TO BEAN AND COWPEA IN PUERTO RICO

Kaiser, W.J.; Vakili, N.G.
United States Department of Agriculture, Agricultural Research Service.
1978, 7 p.

In Phytopathology, Vol. 68, pp. 1057-1063

Bacterial blight of bean and cowpea caused by three pathogenic xanthomonads — *Xanthomonas phaseoli* (Xp), *X. phaseoli* var. *fuscans* (Xpf), and *X. phaseoli* f. sp. *vignicola* (Xpv) — are often important plant diseases during the rainy season in Puerto Rico. Because bacterial blight lesions on these two plants are frequently associated with insect-feeding injuries, this study was initiated to determine whether insects were in fact partly responsible for the dissemination and transmission of the pathogens. After a brief introduction, the study materials and methods are outlined. Both healthy and bacterial blight-infected bean leaves with insect injuries were collected from experimental plantings. Bacterial isolations were made from blight lesions associated with insect damage, from those not associated with insect damage, from insect-feeding injuries without bacterial blight symptoms, and from insect washings. The test plants were then inoculated, insect-feeding tests conducted, and the survival of *Xanthomonas* isolates tested. Most insect-feeding damage to bean and cowpea appeared to be caused by two beetles, *Cerotoma ruficornis* and *Diaprepes abbreviata*, and infection of the test plants by pathogenic xanthomonads took place at the feeding sites of naturally-infested beetles. Infection also resulted when these and two other insect species were artificially infested with different bacterial isolates. However, no infection occurred after 48 hours when the beetles were infested and transferred at daily intervals to healthy test plants. Feeding injuries caused by infested beetles on noninoculated leaves or by noninfested beetles on inoculated leaves greatly enhanced blight lesion development. Bean blight bacteria were isolated from fresh feces of beetles which had fed on infected bean leaves. Several xanthomonads survived for periods up to 19 days on the bodies of live or dead beetles. A concluding section discusses these results. The study confirms that different insect species are vectors of bean blight bacteria, with *C. ruficornis* being identified as the predominant vector under field conditions in Puerto Rico. An 11-item bibliography of literature cited (1957–75) is appended.

PA/RA(AJ)-03-00 RES

051 PN-AAH-210

A "PHYTOPHTHORA" STEM CANKER DISEASE OF PIGEON PEA IN PUERTO RICO

Kaiser, W.J.; Melendez, P.L.
United States Department of Agriculture, Agricultural Research Service.
1978, 3 p.

In Plant Disease Reporter, Vol. 62, No. 3, pp. 240-242

Pigeon pea (*Cajanus cajan*) is the most important food legume cultivated in Puerto Rico. An important industry has developed around this crop to provide fresh, frozen, and canned pigeon peas for local and export markets. Starting in 1973, a new stem canker disease of pigeon pea caused by *Phytophthora parasitica* was observed in experimental and commercial plantings at several locations in Puerto Rico. This article reports on this new disease. The pathogen induced necrotic and often depressed lesions on main stems, branches, and petioles of pigeon pea plants. Foliage above cankers usually wilted and died. Isolates of *P. parasitica* from eggplant, pigeon pea, and tomato were pathogenic to pigeon pea stems in laboratory and greenhouse inoculation trials described in this article. Optimum temperature for growth of the isolates on V-8 juice agar was 30° C. In laboratory studies, isolates infected pigeon pea stem pieces at temperatures of 15-30° C, with an optimum of 25-30° C. Wounding of stem tissues favored infection by all isolates. In greenhouse inoculation studies with five isolates of the pathogen, no infection occurred in 8 days in the absence of wounding. Pigeon pea isolates were more virulent to pigeon peas in laboratory and greenhouse inoculation trials than were isolates from eggplant and tomato. In discussing the results of these trials, the authors comment that it is not known whether sources of resistance to *P. parasitica* occur in pigeon pea. If the canker disease becomes more widespread and damaging in Puerto Rico, it may be necessary to screen the pigeon pea germplasm collection maintained by the University of Puerto Rico to locate sources of resistance to the pathogen that can be used in a breeding program to develop new commercially acceptable, disease-resistant varieties.

PA/RA(AJ)-03-00 RES

052 PN-AAH-211

TWO BACTERIAL DISEASES OF COWPEA IN EAST AFRICA

Kaiser, W.J.; Ramos, A.H.
United States Department of Agriculture, Agricultural Research Service.
1979, 5 p.

In Plant Disease Reporter, Vol. 63, No. 4, pp. 304-308

Cowpea (*Vigna unguiculata*) is one of several legumes that are cultivated as a human food crop in East Africa, particularly in the warmer, lower elevation areas around Lake Victoria and along the East African Coast. Numerous diseases and pests affect the cowpea, contributing significantly to their low yields and poor quality wherever they are grown in Africa. Of the diseases affect-

Cowpeas are examined for disease.

ing cowpeas in Africa, the least appears to be known of those caused by bacteria. In East Africa, the authors of this document have observed cowpeas infected by two seedborne xanthomonads that produced distinct and different disease symptoms on the foliage. These symptoms, bacteriological tests, and pathogenicity of the xanthomonads, as well as a description of collection and processing methods of pathogen cultures are presented in this report. The bacteria causing cowpea bacterial blight (CBB) and cowpea bacterial pustule (CBP) were indistinguishable in cultural, morphological, and physiological properties, and in their pathogenicity to different legume species. Both infected several *Phaseolus* and *Vigna* species. Isolates of CBB and CBP could be differentiated only by the symptoms that they produced on cowpea foliage. Both bacteria are considered to be strains of a member of the *Xanthomonas campestris* group. East African isolates of CBB and CBP could be differentiated from the bacterium causing fuscous blight of bean *X. phaseoli*. var. *fuscans* (Xpf) by their pathogenicity to bean and cowpea. The CBB and CBP pathogens were pathogenic to both bean and cowpea, whereas Xpf was pathogenic to bean only. Literature cited at the conclusion of the report includes 16 entries (1963–78).

PA/RA(AJ)-03-00 RES 618065700

053 PN-AAH-212

USE OF TISSUE CULTURE AND THERMOTHERAPY TO FREE EAST AFRICAN CASSAVA CULTIVARS OF AFRICAN CASSAVA MOSAIC AND CASSAVA BROWN STREAK DISEASES

Kaiser, W.J.; Teemba, L.R.
United States Department of Agriculture, Agricultural Research Service.
1979, 5 p.

In Plant Disease Reporter, Vol. 63, No. 9, pp. 780-784

Cassava is an important food crop in East Africa and the most important disease affecting cassava is African Cassava Mosaic (ACMD). Cassava brown streak disease (CBSD) is another important disease of the cassava. This study presents results of research undertaken to develop methods to free cassava from ACMD and CBSD, using meristem-tip culture and thermotherapy. The etiology of AMD is unknown, but evidence suggests that it is a virus. It is transmissible by grafting, white flies, and mechanical inoculation. ACMD induces leaf distortion on both old and young leaves. CBSD causes rod shaped and isometric particles on the leaves of cassava plants and affects only mature leaves. To develop the methodology used in the research, stakes of cassava were cut into sections with at least four nodes. The upper, exposed end of each stake was sealed with wax and the stakes were planted into a steam-sterilized mixture of sand and soil and placed in a room under optimum conditions for growing. Meristems were excised from the plants every few days. Shoots were surface-sterilized and then placed into agar culture mediums in test tubes; heat treatment was given to some plants before excision of meristems. Regenerated plants were indexed for ACMD and CBSD at various intervals during the course of these studies. All regenerated plants were cut back and stem pieces were rooted and observed for disease symptoms. Callus tissue began forming on the basal portions of excised meristems within 4-5 days and shoot differentiation started in 14-15 days. Regenerated plants were transferred from culture tubes to sand in less than 60 days. Heat treatment of cassava plants before excision of meristems significantly increased the proportion of ACMD- and CBSD-free plants. All regenerated plants that remained symptom free were multiplied with rapid propagation techniques. A 14-item bibliography covering the period 1938–78 is appended.

PA/RA(AJ)-03-00 RES 618065700

AGRICULTURE

054 PN-AAH-213

LEAF-SCORCH DISEASE OF SUGARCANE IN KENYA CAUSED BY A NEW SPECIES OF "LEPTOSPHAERIA"

Kaiser, W.J.; Ndimande, B.N.; Hawksworth, D.L.
United States Department of Agriculture, Agricultural Research Service.
1979, 14 p.

In Mycologia, Vol. 71, No. 3, pp. 479-492

Kenya's sugarcane production is threatened by a new foliar disease caused by *Leptosphaeria bicolor*. This document discusses this pathogen, its life cycle, distribution, taxonomy, morphology, cultural characteristics and pathogenicity. In Kenya, over 50 sugarcane fields were surveyed and the disease was located only in the Western Province. The initial disease symptoms appear on sugarcane leaf blades as small, red-to-dark-brown spots, characteristically surrounded by a brownish-yellow halo. The spots eventually turn reddish and may enlarge. The centers of the older lesions are straw colored and surrounded by a reddish margin. In severe cases, most of the leaf lamina becomes scorched. Both the perfect and the imperfect (*Stagonospora*) stages of the pathogen developed in pure cultures initiated from single ascospores. *L. bicolor* varied in mycelial growth, pycnidial formation, and conidial production. Maximum mycelial growth occurred on the oatmeal agar (OA). Pycnidial formation was most apparent on OA and malt agar. Optimum temperature for mycelial growth on potato dextrose agar was 27° C. The perfect state of *L. bicolor* did not develop in the nutrient media, but formed within 10-15 days on a natural water-agar medium containing autoclaved sugarcane-leaf pieces. In controlled inoculation studies, *L. bicolor* was pathogenic to the sugarcane leaves of varieties Co421, Co775, H37/1933, and NCo 376. It is recommended that if the disease becomes widespread, the most practical control measure would be to screen sugarcane varieties for resistance to the pathogen. Little is known about the environmental factors which favor infection, spread, and survival of *L. bicolor* under field conditions. Investigations of this kind would be helpful in explaining why disease severity appears to increase during the dry season and whether reservoir hosts are important in overseasoning of the pathogen. The perfect state in the disease cycle also requires further examination. A bibliography containing 12 sources (1950–77) written in English, German, and French is included.

PA/RA(AJ)-03-00 RES 618065700

055 PN-AAH-214

NATURAL INFECTION OF COWPEA AND MUNG BEAN BY ALFALFA MOSAIC VIRUS IN IRAN

Kaiser, W.J.
United States Department of Agriculture, Agricultural Research Service.
1979, 5 p.

In Plant Disease Reporter, Vol. 63, No. 5, pp. 414-418

Cowpea (*Vigna unguiculata*) and mung bean (*Vigna radiata*) are two of several food legumes grown in Iran for human consumption. Alfalfa mosaic virus (AMV) is frequently encountered as a pathogen of these legumes in Iran. This article reports on a study initiated to describe the diseases of cowpea and mung bean caused by AMV and to investigate various properties of the virus. After a brief introduction, the study's methods and materials are outlined. Test tissue was derived from naturally infected cowpea and mung bean plants collected in various regions from 1966–71 as well as from plants grown in a greenhouse setting. Isolates of AMV were separated from other viruses and maintained in alfalfa, cowpea, or tobacco. Host range inoculation trials and insect transmission studies were carried out using standard procedures. Next, the results of the study are presented. Cowpea and mung bean plants naturally infected with AMV were typically stunted, and their foliage exhibited yellow mosaic (calico) symptoms, as did the pods of some infected cowpea accessions. The incidence of AMV in cowpea and mung bean plantings was usually less than 10%. Inoculation of cowpea in the field with AMV strains from cowpea or alfalfa at the full-bloom and pre-bloom stages reduced seed yields about 15% and 50%, respectively. No mortality of infected plants was observed in these studies. The virus was transmitted by the pea aphid (*Acyrthosiphon pisum*) in a stylet-borne (noncirculative) manner from AMV-infected alfalfa and cowpea to healthy cowpea. Seeds harvested from naturally or artificially infected cowpeas apparently did not transmit the virus. No resistance to AMV was detected among 56 cowpea lines inoculated with cowpea yellowing isolate under greenhouse conditions. A final section contains a discussion of these results. Cowpea and mung bean plants infected with yellowing strains of AMV invariably were found to be growing near alfalfa plantings. Cowpea fields were generally more severely affected by AMV than mung bean plantings, and the disease of mung bean caused by AMV appears to have had limited effect on agriculture in Iran. A 7-item bibliography of literature cited (1968–75) is appended.

PA/RA(AJ)-03-00 RES

056 PN-AAH-215

OCCURRENCE OF TOMATO BLACK RING VIRUS IN POTATO CULTIVAR ANETT IN KENYA

Kaiser, W.J.; Bock, K.R.; Guthrie, E.J.; Meredith, G.
United States Department of Agriculture, Agricultural Research Service.
1978, 5 p.

In Plant Disease Reporter, Vol. 62, No. 12, pp. 1088-1092

In the last 10 years, tubers of numerous potato lines have been introduced into Kenya for testing, with the aim of increasing potato production through breeding and selection of varieties resistant to important diseases, particularly late blight, bacterial wilt, and viruses. This article reports on a study to assess the relationship of the Anett isolate of the tomato black ring virus (TBRV) to other nepoviruses and to investigate the biological and physiological properties of the virus. After a brief introduction, the study's materials and methods are outlined. An isolate of TRBV from Anett potato collected at the Grasslands Research Station, Marindas, was used in all host range, seed and vector transmission, and serological studies. Next, the results of these studies are presented. The Anett isolate was serologically related to the beet ringspot virus group of TBRV. It did not react with antiserum to the type (tomato) strain of TBRV or to antisera of tobacco ringspot, tomato ringspot, or raspberry ringspot viruses. The host range of the Anett isolate was extensive and the virus was seedborne in several artificially inoculated food crops and weed hosts. The virus was not transmitted by aphids or the nematode *Longidorus laevicapitatus*, which occurs in soils of the potato-growing regions of Kenya. The article concludes with a discussion of these results. This is the first published report of TBRV on the African continent, and it seems likely that TBRV was introduced into Kenya in virus-infected Anett potato tubers. This illustrates the ease with which new and potentially dangerous pathogens, like TBRV, can be introduced into new areas when special precautions are not taken. The importance of strict observance of quarantine in importations of potatoes is thus emphasized. An 11-item bibliography of literature cited (1957–77) is appended.

PA/RA(AJ)-03-00 RES 618065700

057 PN-AAH-229

STUDY ON KRESEK (WILT) OF THE RICE BACTERIAL BLIGHT SYNDROME

Mew, T.W.; Vera Cruz, C.M.; Reyes, R.C.; Zaragoza, B.A.
International Rice Research Institute (IRRI).
1979, 10 p.

In IRRI Research Paper Series, No. 39

Bacterial blight caused by *Xanthomas oryzae* has three symptoms: leaf blight, kresek (wilt), and pale yellow. Kresek was first reported in 1950 in Indonesia and was assumed to be a new disease. In 1964, Goto, working at the International Rice Research Institute (IRRI), identified the causal bacterium as *X. oryzae* and confirmed that kresek is a symptom of the bacterial blight syndrome. Since then, kresek has been recognized in the Philippines, Malaysia, India, and Sri Lanka. Recent information from China and Korea indicates that kresek, while common in tropical Asia, is not restricted to the tropics. Early research has not succeeded in clarifying fully the pathological relationships between the three symptoms of the bacterial blight syndrome. The present paper reports on research undertaken at IRRI on kresek infection, methods of inoculation, and the relationship between varietal resistance to leaf blight and to kresek. Two strains of *X. oryzae*, the leaf blight strain PXO61 and the kresek strain PXO82, were used throughout the experiments. Pure cultures of the two strains were maintained and used on agar slants of potato or peptone sucrose medium (PSA) at -10° C. Inoculum of each strain was prepared on PSA from 72-h-old cultures. Kresek symptom of the bacterial blight syndrome developed on rice seedlings when they were inoculated by leaf-clipping or root-dipping. Kresek resulted with less frequency when older plants were infected with leaf blight. The pale yellow symptom was found to be a secondary effect of either leaf blight or kresek. The older the plants, the lower the percentage of kresek induced by root dip. There were varietal differences to kresek infection. IR1545 was as susceptible as IR8 from 9 to 16 days after sowing (DS), but only a minimum incidence of kresek was induced at 32 DS. Varieties such as IR20 and IR1545 are resistant to leaf blight but as susceptible as IR8 to kresek. Dipping seedling roots in zinc solution before transplanting reduced the incidence of kresek. The results suggest that varietal response to kresek infection may be different from that of leaf blight infection. A 14-item list of Japanese and English language literature cited (1950–79) is appended.

AID/DSAN-G-0083 931082600

058 PN-AAH-232

VARIATION IN VARIETAL REACTION TO RICE TUNGRO DISEASE: POSSIBLE CAUSES

Ling, K.C.
International Rice Research Institute (IRRI).
1979, 9 p.

In IRRI Research Paper Series, No. 32

Field tests have revealed that different rice varieties vary in their reaction to rice tungro disease. In 1975, for example, eight varieties showed three groups of reaction — resistant, intermediate, and susceptible — in different locations at different times. To investigate the causes of this variation, a Rice Tungro Virus (RTV) Collaborative Project involving seven collaborators in five countries was initiated in 1978. This project emphasizes experiments to determine variation caused by biotypes of RTV vectors or RTV strains. The present paper discusses causes of variation in varietal reaction to rice tungro disease other than those under study by the RTV Project. The variation may be due to mechanical errors, e.g., a variety shows a reaction in the field, but is noted differently in a notebook or publication. Causes of such errors are negligence in handling test materials, misidentification of the disease, difference in ability to score the reaction, and insufficient replicates (number of test plants per entry, number of replicates in a test, and number of repeated tests). The latter is especially important because the standard evaluation system for varietal resistance to tungro disease is based on the percentage of infected plants. Another cause of variation in varietal resistance is the difference in the field reactions of rice varieties. Such differences are caused by the existence of different biotypes of tungro vectors or strains among locations or tests, and variation in tungro disease pressure to the variety in the tests. Causes of the first type, that is, mechanical errors, are controllable and can be minimized or reduced through greater effort. Causes due to differences in varietal field reactions can be minimized by conducting repeated tests and computing an average reaction. The report concludes by noting that the vectors and strains currently under investigation by the RTV project may differ among locations, in which case a variety that is constantly resistant in a location or region would at least be useful in reducing tungro disease incidence in that location or region. An 8-item bibliography (1968–79) is appended.

AID/DSAN-G-0083 931082600

AGRICULTURE

059 PN-AAH-348

THE IMPACT OF CREDIT, PRICES, TECHNOLOGY, AND EXTENSION ON FERTILIZER DEMAND IN RAINFED AREAS IN THE PHILIPPINES

David, C.C.; Gascon, F.B.; Barker, R.
Ohio State University Department of Agricultural Economics and Rural Sociology.
1979, 23 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 3

Most attempts to identify the impact of credit on fertilizer use in the Philippines have failed to separate the impact of credit from that of other factors such as price, technology, and extension. Such studies have also focused on irrigated farms, even though 75% of the country's rice lands are unirrigated. This document attempts to separate quantitatively the various factors affecting fertilizer use in the country's rainfed areas (related to the Rainfed-Upland Rice Project [RURP]). A conceptual model for analyzing the roles of these factors is presented first. Next, empirical estimates of fertilizer demand functions are given to calculate the impact of each factor on changes in fertilizer use between 1971 and 1977. This information is based upon a study of the RURP and the Masagana 99 Program (M99) in Bulacan and Nueva Ecija conducted by the International Rice Research Institute (IRRI). Constraints to fertilizer use showed the following relationships: (1) fertilizer demand was higher for farmers able to borrow from low-cost sources, while a lack of liquidity, the inability to borrow, or a high credit cost inhibited demand; (2) financial standing in relation to farm size and tenure also affected demand, but so did fertilizer prices (by lessening demand) and the increased growing of short-term modern varieties which increased demand; and (3) extension (demonstration plots) facilitated borrowing from formal sources which also increased fertilizer use. This study indicated that prices, fertilizer productivity due to modern crop varieties, and extension were found to be relatively more important than credit in accounting for variations in fertilizer consumption during this period. Estimates of credit significance in 1974 were difficult to interpret because of the tighter linkage of extension and subsidies to credit and fertilizer price. The authors concluded by noting the limitations of their study for price policy analysis. A bibliography containing eight sources (1975–79) is included.

AID/ta-BMA-7 931116900

060 PN-AAH-585

AN ANNOTATED BIBLIOGRAPHY OF CHICKPEA DISEASES 1915-1976

Nene, Y.L.; Mengistu, A; Sinclair, J.B.; Royse, D.J.
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
1978, 49 p.

In Information Bulletin No. 1

Chickpea (*Cicer arietinum*) is a native Asian plant species grown as a pulse crop throughout tropical and subtropical Asia, northern Africa, southern Europe, Central America, and the southern U.S. It is a major source of protein for millions of people, especially in developing countries in the Eastern Hemisphere. About 11 million hectares of chick peas are cultivated annually around the world, with subsistence farmers of semiarid India producing more than 75% of the crop. This bibliography endeavors to provide a complete working file of the literature concerned with chickpea diseases and to assist in the identification of fungal and bacterial microorganisms associated with chickpea seeds. It is intended especially for scientists in the developing world who do not have ready access to large and well-stocked scientific libraries. The bibliography contains 331 citations, and is based on a literature search (1915–76) that ended with the December 1976 issues of *Biological Abstracts, Phytopathology, Plant Disease Reporter*, and *Review of Plant Pathology*, and the December 1975 issue of *Indian Phytopathology*. In order to gather as much information as possible, papers from conferences, and symposia have been included. Each citation is accompanied by either an abstract or annotation prepared by the original author or derived from *Biological Abstracts* and *Review of Plant Pathology* (*Review of Applied Mycology*). Most papers are printed in English. Foreign language publications include French, Spanish, German, Russian, Spanish, Hindi, Italian, Farsi, Portuguese, Turkish, Hebrew, Japanese, and Romanian, with the language of the publication, excluding English, indicated after the title. Concluding the bibliography is an index divided into five sections according to the causal agent of the disease: fungi, bacteria, viruses, nematodes, and phanerogamic parasite. Additional indices deal with seed-borne diseases, chemical control, and miscellaneous topics.

AID/ta-G-1499 931097200

061 PN-AAH-586

PROCEEDINGS OF THE INTERNATIONAL WORKSHOP ON THE CASSAVA MEALYBUG "PHENACOCCUS MANIHOTI" MAT-FERR. ("PSEUDOCOCCIDAE"), ZAIRE, 1977

International Institute of Tropical Agriculture (IITA).
1978, 90 p.

The International Institute of Tropical Agriculture (IITA), Nigeria, and the Department of Agriculture, Zaire, cosponsored an international workshop on the Cassava Mealybug, *Phenacoccus Manihoti* Mat-Ferr (*Pseudococcidae*) in Zaire, June 26–29, 1977. This report of the workshop proceedings includes an opening paper and eight technical papers, each accompanied by references. The opening paper addresses IITA's role in tropical agriculture, with special emphasis on the Zaire program. The technical papers concern observations, biology, taxonomy, ecology, and pest management of the cassava mealybug, and its incidence in the People's Republic of Congo, as well as on manioc (*Manihot esculenta*) in Bas-Zaire. A summary of workshop discussions and recommendations are included. These cover the origin and distribution of the mealybug; its development; the damage it inflicts; ways of controlling it culturally, chemically, and biologically; and hostplant resistance. In Africa, the cassava mealybug is of the American type and was probably introduced by the transfer of vegetative manioc materials. *Phenacoccus gossypii* has been reported in Brazil and Colombia. There may be similarities between the feeding activity of the sugarcane and the cassava mealybug. It is suspected, however, that the appearance of short internodes, cell enlargement, and distortion in cassava may be due to the introduction of a toxin or growth inhibitor. Comparisons of infested and mealybug-free plants show no yield differences, but there are varietal differences depending on the nature of leafsheets. Comparisons of insecticide-treated and untreated plots show no yield differences. In searching for resistance, differences among genotypes must be assumed. Research on biological control of the mealybug should include a search for and evaluation of natural enemies in the mealybug's country of origin, and introduction of promising species into the subject country. Recommended control strategies include cultural, chemical, and quarantine pest management programs and research emphasizing breeding for hostplant resistance and biological control. A list of workshop participants is included.

AID/ta-G-1491 931030900

062 PN-AAG-785

THE POTENTIAL FOR REGIONAL COOPERATION IN FERTILIZER: A METHODOLOGY STUDY

Foster, T.H.; Livingston, O.W.; Stangel, P.J.
International Fertilizer Development Center (IFDC).
1976, 56 p.

In Technical Bulletin IFDC-T-2

Due to world fertilizer market instability and the importance of fertilizer as a strategic policy tool, the members of the Association of Southeast Asian Nations (ASEAN), composed of Indonesia, Malaysia, the Philippines, Singapore, and Thailand, plan to devise a policy to develop adequate, dependable, low-cost fertilizer supply alternatives. Under consideration is an expanded fertilizer production policy utilizing the concepts of economic cooperation and regional integration. The present document, a joint product of the International Fertilizer Development Center (IFDC) and IBRD, provides a preliminary methodological study of the potential benefits of this policy. The study used a mathematical programming model to determine the investment, production, importation, and transportation patterns that minimize the costs of meeting ASEAN's 1985 fertilizer requirements. This included the selection of plant sites and sizes, feed stocks, product mix, and transportation patterns most appropriate for varying degrees of economic cooperation. Results indicate that although the region's fertilizer production capacity is not expected to meet 1985 regional requirements, regional cooperation would lead to substantial economic benefit for all ASEAN members. Urea and monoammonium phosphate comprise the region's optimal product mix. The advantage of Indonesia in ammonia and urea production and of the Philippines in phosphate production will dominate regional industry adjustments to the anticipated 1985 supply/demand situation. An expanded analysis is recommended to determine the optimal timing of investment between 1978 and 1985 for a larger number of regional economic integration and trade relationships. Additional recommendations include studies of parameterization, alternative transportation and distribution systems, carnallite deposits, and constraints to regional cooperation. A 13-item bibliography (1974–75) and illustrative statistical tables are appended.

AID/ta-G-1218 GTS 931005400

063 PN-AAH-317

ADMINISTRATIVE REFORM IN PORTUGAL: AN ASSESSMENT OF THE CRISIS IN PUBLIC MANAGEMENT WITH RECOMMENDATIONS FOR ACTION

Macy, J.; Gallas, N.; Hobgood, H.; Post, A.; Sherwood, F.
United States Agency for International Development, Development Support Bureau, Office of Rural Development.
1979, 151 p.

That the financial management of the Portuguese Government requires immediate and serious attention is the crux of this report prepared by five senior U.S. public administrative consultants. The consultants report that Government estimates of revenue are frequently incorrect, resulting in too high expenditures and large deficits. Budgets are formulated without regard to the goods and services they are to accomplish. Six basic actions are recommended: (1) strengthen the management capacity of the Office of the Prime Minister; (2) improve all aspects of financial management from the planning of investments and budgeting of expenditures through the auditing of accounts and evaluation of performance; (3) reallocate authority to regional, district, and local authorities for more expeditious decisionmaking and delivery of services; (4) give special attention to the agriculture and rural development sector; (5) accelerate the preparation of all necessary policy, organizational, and procedural changes to effect administrative reforms in manpower planning, personnel administration, and labor management relations; and (6) mobilize existing resources and design new institutions for the training of managers at all levels. This report consists of an overview report, followed by five supporting papers on financial management; decentralization, deconcentration, and devolution; rural development; personnel policies, manpower development and management training; and public enterprise management.

DS/RAD 1500001

064 PN-AAH-318

GOVERNMENT AND ADMINISTRATION IN THE YEMEN ARAB REPUBLIC

Gable, R.W.
United States Agency for International Development, Development Support Bureau, Office of Rural Development.
1979, 167 p.

Prior to the revolution of 1962, the administration of Yemen was a living fossil — a patrimonial system of theocratic and highly personal rule by an Iman, with virtually unlimited power. Yemen lacked not only a civil service system, but public services as well. The government now employs more than 30,000 persons, and the number is rapidly growing. While the system is not based on merit, neither does it seem to encourage some of the more outrageous abuses of patronage. The most serious problem is an overall lack of experience, education, and training among the civil servants. This report, intended as a "primer" on public administration in the Yemen Arab Republic, is based on a visit to the capital city of Sana, November 27 to December 14, 1974. Over 40 persons employed by, or knowledgeable about, the Yemeni Government were interviewed. A substantial history and cultural review is provided in the report, covering the revolution of 1962, and political and administrative developments since that time. The structure of government, traditional sources of revenue, religious rivalries, and traditional legal systems are outlined. In addition, the author examines the pro's and con's of top-down and bottom-up development strategies, and concludes that neither alone is likely to be effective. The following actions are recommended: (1) develop the institutional capacity to stimulate, assist, and sustain rural development; (2) develop the institutional capacity to train administrators and managers; (3) assist selected ministries to deliver services to rural dwellers; and (4) improve the capacity of the central government to collect and allocate available resources (both foreign and domestic) so that the above activities can take place. A brief bibliography is included in the report (19 entries, 1915–79).

DS/RAD

065 PN-AAH-493

EXPATRIATE PROFESSIONALS AS INTERNATIONAL CONSULTANTS

Stepanek, J.E.; Ivory, M.
United States Agency for International Development, Technical Assistance Bureau, Office of Science and Technology.
1979, 72 p.

The permanent migration of professionals from LDCs is a problem of growing concern to countries worldwide as it creates a deficit of intellectual leadership in the LDCs. This "brain drain" can also occur when the educated are attracted to urban centers from rural areas within their own country. This report reviews the major findings of recent literature on the problem and recommends a means of returning expatriate professionals residing in the U.S. to their native country as short-term volunteer consultants. The financial loss to LDCs through education investment in professionals who migrate is substantial and their loss in terms of managerial, entrepreneurial and decisionmaking skills is even greater. Of all the expatriate professionals now living in developed countries, about half (250,000) live in the U.S. These include engineers, technologists, natural scientists, and others who could contribute to economic growth in their native countries. On the basis of results of an experimental program between the Government of Turkey and the U.N. Development program, this report recommends an action program through which expatriates residing in the U.S. would be encouraged and assisted in transferring technology appropriate to the needs of their home countries. Besides being a practical approach to the brain drain problem, such a program would support employment-creating projects for the poor majority and provide a cost-effective substitute for traditional technical assistance. Under this program, LDCs would receive a package of benefits, including repeat visits, continuing services from the U.S., and the chance that expatriates will return permanently. For initial implementation of the program, it is recommended that: (1) autonomous organizations be established in participating LDCs with links to government, business, and others seeking volunteer services; (2) a cooperating U.S. private organization be identified and that this organization be formed between International Executive Service Corps and Volunteers in Technical Assistance; (3) four LDCs be invited to participate initially; and (4) expatriate associations in the U.S. be encouraged to participate. This report includes a 12-item bibliography (1966–78) and four appendices.

TA/OST

066 **PN-AAH-502**

GUIDELINES FOR AID'S REGIONAL ACTIVITIES IN AFRICA

Belcher, M.S.
1980, 72 p.

All A.I.D. regional projects should be consistent with one or more of the following principles: (1) cooperation among two or more countries is essential to success; (2) the project strengthens and increases inter-country cooperation; (3) a regional project is more efficient for administrative purposes; (4) project activities are experimental and promote exchange of experience; and 5) it is more convenient to group a series of small country activities under a single "umbrella" project. These are some of the main findings of a study to develop a strategy for A.I.D.'s African regional development (AFR/RA) program. The author notes, however, that many of the present umbrella projects neglect opportunities for exchange of experience and also that, despite excellent opportunities, food and agriculture projects account for only about 12% of A.I.D.'s total regional efforts. It is recommended that A.I.D. support to African regional organizations be based on the degree of genuine African support, the extent of real regional activity, effectiveness, receptivity to A.I.D. assistance and cooperation, concern for basic human needs, cooperation with other organizations, and support by other donors. Nine principal types of activity are found appropriate for regional projects. These include participant and in-country training, student and faculty exchanges, attacks on pests and diseases, cooperative research, middle level technical training, distance learning, documentation collection and dissemination, and experimental approaches to common problems. Especially recommended areas of research are family planning; common tropical disease problems; common ecologically-based problems of crops, cattle, and soils; land tenure and use; and the effective use of mass-media for education. Technical training in repair and maintenance for transportation and communications activities is urged, and planners are admonished not to ignore urbanization and increasing underemployment and unemployment. The paper concludes by reviewing the AFR/RA program in various functional areas against these guidelines and assessing future development needs which might be met on a regional basis. Various appendices and a 45-item bibliography (1970–80) are included.

AID/afr-C-1554 698013500

067 **PN-AAH-598**

EAST AND SOUTHEAST ASIA: A BIBLIOGRAPHY

University of Wisconsin, Land Tenure Center (LTC).
1979, 122 p.

In LTC Training and Methods Series, No. 14, Suppl. 2

As materials dealing with East Asia are extensive in the Land Tenure Center Library at the University of Wisconsin, a bibliography has been compiled listing those references. This present document is a supplement to that bibliography. Approximately 1,500 citations (1954–78) are entered for Asia, Central Asia, East Asia, China, Hong Kong, Japan, Korea, People's Republic of Korea, Republic of Korea, Macao, and Taiwan. Common subject headings listed under Asia, China, Hong Kong, Japan, Republic of Korea, and Taiwan include agriculture, economy, labor and employment, and land tenure and reform. Subject headings listed for Central Asia (Mongolia, Russian Central Asia, and Tibet) pertain generally to economies, industrial development, and social change. References for Korea deal with its political division, agricultural development, and land systems, ownership, and distribution. Other subject headings include communes and collectives; foreign aid and relations; industry and labor; politics and government; population and family planning; science and technology; social conditions; trade; women; technological change; food and foodgrains; reclamation; rural and community development; cities and towns; cooperatives; and credit, finance and taxation. With the occasional exception of documents written in the French, German, and Spanish languages, the references are published in English.

AID/csd-2263 211(d) 931011100

068 **PN-AAH-143**

STATUS OF WOMEN, SRI LANKA

Colombo University, Sri Lanka.

Constitutional rights, coeducation, and other advances have not yet dispelled the low cultural value assigned to women in Sri Lanka and other South/Southeast Asian countries. This report, initiated by a group of women from Colombo University, consists of eight studies profiling the status of women in terms of sociocultural factors, demographics, law, creative arts and the mass media, education, economics, political participation and decisionmaking, and health and nutrition. It is based on national-level surveys and official statistics, supplemented by field studies. The field studies were carried out in three rural areas representative of the nation's major ethnic groups (the Sinhala, Tamil, and Muslims) and in a mixed-population urban area. The studies highlight discriminatory practices and attitudes that bedevil the progress of women in Sri Lanka. One survey showed a majority of employers (78.6%) endorsing both sex-based job differentiation and male preference in job recruitment (60.7%). Although greater numbers of women are seeking higher education, patterns of enrollment reflect cultural attitudes which favor the teaching and medical professions for women and reserve technology as a male field. Such sex disparities are even greater in vocational education programs. In addition, stereotyped images of women as portrayed in popular nov-

A woman physician examines a young patient in Calcutta.

Women participate in literacy training in Bangladesh.

els, films, and advertising (i.e., as weak and passive or dangerously seductive) are documented and discussed. As a result of these studies, recommendations were formulated to serve as the basis for a much-needed national plan to improve the status of women. Among the actions recommended are: (1) the introduction of legislation to bring personal law in line with general law in those areas in which women suffer disabilities — for example, divorce under Muslim law and women's rights to contract and dispose of property under Thesawalamai law; (2) sponsorship of consciousness-raising programs to help question the legitimacy of present cultural and ideological beliefs pertaining to women; and (3) removal of regulations and administrative practices that conflict with the principle of equal employment opportunities for women. Bibliographies follow each section of the report.

PPC/WID

069 PN-AAH-309

INTEGRATING WOMEN INTO NATIONAL ECONOMIES: PROGRAMMING CONSIDERATIONS WITH SPECIAL REFERENCE TO THE NEAR EAST

Van Dusen, R.A.
1977, 72 p.

Although literature on women's role in development goes back at least a decade, it is still a fugitive literature, with more than half not published except in-house. This document presents an overview of the literature and issues pertaining to women in development, particularly in the Islamic Near East. Regarding that region more than any other, it is the feeling of development personnel that virtually nothing is known about women's roles, and that little can be done to bring women into the economic mainstream. Four major hypotheses or assumptions regarding women in development are examined in this report: (1) that the literature on women in development is not policy-oriented; (2) that the obstacles to reaching women are almost insurmountable; (3) that little is known about Near Eastern women, and that is the way the Near Eastern governments want it; and (4) that women in the Near East do not work and do not want to work. The author suggests four types of projects for women which are most likely to succeed — income-producing activities (rural industries, handicrafts, cooperatives, etc.), projects which bolster the organization and programs of local women and their communities, those related to the upbringing of children, and projects that enhance the competence or desirability of wives and homemakers. The significance behind these projects is that they are based upon accepted roles for women. Two bibliographies are provided, an annotated bibliography covering women in development in general (77 entries, 1964–77), and a bibliography of materials on women in the Near East (141 entries, 1970–76). The second bibliography is not annotated and lists 25 titles in French.

AID/ne-147-77-2 298003500

070 PN-AAH-331

WOMEN IN RURAL DEVELOPMENT: A BIBLIOGRAPHY

Phillips, B.
University of Wisconsin, Land Tenure Center (LTC).
1979, 48 p.

In LTC Training and Methods Series, No. 29

What are the roles currently played by women in rural development? The present bibliography provides a wide range of source materials to answer this question. A first section consists of entries relating to the developing world in general. Later sections are grouped by region and include Africa, Asia, Europe, Latin America, the Near East, and the United States. Most of these materials were published in the 1970's. A large number of Spanish, and some French titles, appear. Unfortunately, no introduction detailing the origin of the bibliography or its usefulness is provided.

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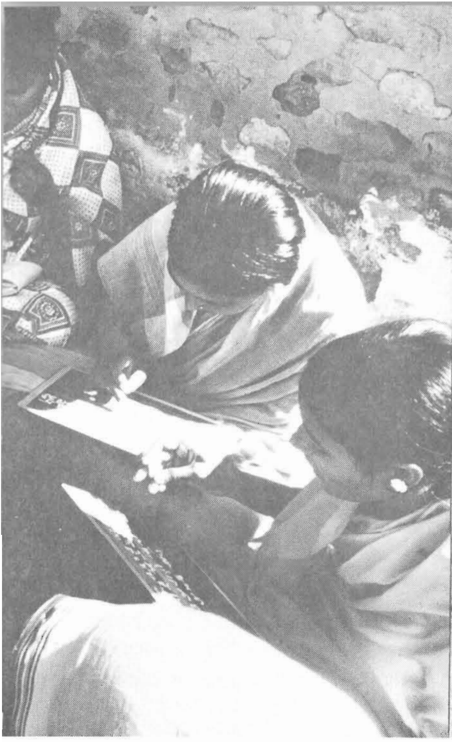

Women labor in a rice paddy in Sri Lanka.

071 **PN-AAH-437**

A STUDY ON THE STATUS OF KOREAN WOMEN IN NATIONAL DEVELOPMENT

Kim, O.Y.; Lee, K.
Sookmyung Women's University.
1977, 88 p.

Since the advent of the women's liberation movement in the United States and Europe in the 1960s, and the U.N. proclamation of 1975 as International Women's Year, several studies concerning the status of women in Korea have been conducted. These studies, however, have failed to examine the role of Korean women in national development and the degree to which they participate in the decisionmaking process. This study examines both of these issues, and is therefore both innovative and valuable. An introductory chapter provides a brief literature review on the historical, political, legal, educational, and socioeconomic status of Korean women, and the research methodology of the present study. Several variables are examined: age, education, duration of marriage, economic status, consciousness of discrimination and women's status, and residence. A random sample of 866 Korean women from Seoul and six rural areas was drawn to test the hypothesis that Korean women will perform more effective roles in national development as they become more involved in decisionmaking. Chapter two presents the study's theoretical framework by reviewing the improvement of women's status in light of feminist ideologies, changing sex roles, and the economic contribution of working women; and defines the concepts of status, power, authority, and role. Chapter three examines demographic, educational, and socioeconomic indicators of women's status, postulating that as womens' age, education, marital longevity, urban proximity, economic status, and consciousness of their status and of discrimination increase, so does their participation and power in the decision making process. In the final chapters, the above postulations are verified, thus confirming the study's central hypothesis regarding women's potential role in national development. Further research is suggested with additional indicators of religion, occupation, and family system. A study comparing this project's findings with the findings of similar projects in other countries, as well as a study of Korean men's views toward women's status, are also recommended. Footnotes and a 50-item bibliography (1956–77) are appended.

AID-498-WID-3-T 489024900

072 **PN-AAH-579**

WOMEN IN A DEVELOPING ECONOMY: A WEST AFRICAN CASE STUDY

Spencer, D.S.C.
Michigan State University, Department of Agricultural Economics.
1979, 69 p.

The role women play in the economic development process and the benefits they derive therefrom are of concern to donor agencies and policymakers. This monograph presents a case study of the role of women in the rural economy of Sierra Leone. A series of detailed surveys were conducted of both farm and non-farm households in Sierra Leone; these included sampling and recording of farm-level activities, migration patterns, fishing, small-scale industry, and the role of women in household decisionmaking. Households were visited twice a week for at least 12 months. Detailed analyses of these surveys resulted in general conclusions. Women play an important role in agriculture and contribute at least 40% of the total labor input. Agricultural development projects which stress mechanization tend to have an adverse affect on the female work load as they increase the amount of land available for planting, weeding and harvesting which are the woman's primary functions in agriculture. It has been found that women play a small role in small-scale industrial activities in both rural and urban areas with the exception of the gara industry which is dominated by women. The survey indicated that, on the whole, wage rates are lower for women than for men in both rural and urban areas. It was also found that women play a minor role in agricultural decisionmaking, but an important role in household decisionmaking as well as in decisions relating to the borrowing of money. Finally, it was discovered that women share equally in the proceeds of the sales of cash crops as well as in the profits derived from retail trade. This study indicates that while there is no need to develop special agricultural policies for women in Sierra Leone, government should ensure that profitable female-dominated activities are encouraged. Also, help in the form of extension advice is needed to raise incomes in the low-income, female-dominated activities. The government should ensure that its tariff and macro-economic policies do not discriminate against female-dominated enterprises. A 30-item bibliography (1952–79) and survey forms are appended.

AID/afr-C-1364 931000100

073 PN-AAH-601

SOCIAL CHANGE AND RURAL WOMEN: POSSIBILITIES OF PARTICIPATION

Adnan, S.; Islam, R.
University of Wisconsin, Land Tenure Center (LTC).
1979, 21 p.

In LTC Reprint No. 137; prepared for a seminar on The Role of Women in Socioeconomic Development in Bangladesh

The women of rural Bangladesh live in a world of both real and symbolic seclusion: they are second-class citizens because of political, economic, social, and legal bondage. The rural culture is male dominated to an extreme degree. Polygamy, seclusion (purdah), universal distrust of feminine emancipation, and flouting of the Family Law Ordinance are practiced. This report discusses the role of women in rural Bangladesh and suggests methods of improving their situation. The status and emancipation of women rests on their relation to the means of production and their consequent roles in production organization, including that of the family-based production unit which is present in the rural economy. Lack of organization and consciousness regarding these factors have kept women in a depressed status. The actual and potential contribution of women to the rural economy is staggering. Most of the women spend their productive time working in the home and caring for their children, or performing menial tasks such as fetching water and dehusking rice. If some of this time could be saved through the advent of simple technologies such as communal running water and use of dehusking machines, much of the women's time could be spent in productive work outside the home. Day care centers, which would be needed in such an eventuality, could easily be provided. Women also need to be educated to carry out some degree of production outside the home. While potential levels of available skilled female labor are high, this potential is not, in reality, very encouraging given the high overall unemployment rate in Bangladesh's villages. A possible solution is the development of policies to promote industrial labor by men so that women could engage in those agricultural activities for which they are as capable as men. However, before attempting to change the status of women in Bangladesh, planners must constantly remind themselves that there are extremely conservative social and religious forces in these villages which will strive to undermine any change in the social status of women. A bibliography of 19 references (1974–76) is appended.

AID/csd-2263 211(d) 931011100

074 PN-AAH-603

ZINACANTECO WOMEN: PREDICTION FOR CHANGE IN A MEXICAN VILLAGE

Hogan, J.; Tienda, M.
University of Wisconsin, Land Tenure Center (LTC).
1979, 23 p.

In LTC Paper No. 120

Recent studies on the changing roles of women have focused on the impact of modernization upon their traditional activity. This case study argues the thesis that the ability of the Zinacantecos (Mexican Indians) to mitigate the potentially destabilizing forces of modernization rests to some extent on how their women, who have been secluded from these forces, manage to maintain their traditional life-style. The old social and institutional arrangements that inhibit women's activity are considered first. The authors then suggest how the ecological imbalances stemming from population growth might undermine the ability of the Zinacantecos to maintain traditional cultural and ethnic identity. For the Zinacantecos, land use defines the social organization. Due to the narrow resource base available from their own farmlands, Zinacanteco men must move into lowland farming and wage labor, which increases their contact with the Mexican ladino culture and the need for Spanish language skills. This increases individual wealth and can alter traditional living arrangements after marriage, as well as the ceremonial foundation of Zinacantan society, the wealth-based cargo system. Presently, the cargo system is becoming overloaded by excessive applications. Women, on the other hand, are confined to domestic duties and are buffered from external influences by their husbands. The home is the bastion of ethnic identity and women remain the guardians of that identity. Their roles are dictated by Zinacantan institutions and ritualized life style. Increasing contact with the ladino environment, however, may begin to force women to go outside the home, attend school, learn Spanish, adopt ladino dress, and participate in activities formerly reserved to men. This would require a redefinition of the traditional social image of women. In the long run, such a strategy may be preferable to that of maintaining the old culture by isolating women into their traditional roles. Indeed, the stress placed on the system by increasing population growth may make maintenance of the old culture self-defeating. A bibliography of 15 English sources (1965–77) is included.

AID/csd-2263 211(d) 931011100

075 PN-AAG-784

THE USE OF ECONOMIC MODELS IN EVALUATING THE IMPACT OF RURAL DEVELOPMENT AND INCOME REDISTRIBUTION PROGRAMS IN THE LDC'S

Applegate, M.J.
1975, 86 p.

In Faculty Working Paper No. 38

Whether rural development results in a redistribution of income in favor of the poor is an unresolved question in the development literature. This study approaches this question by analyzing the use of existing economic models to evaluate the impact of rural development and allied income redistribution programs in LDCs. In part one, two-sector models of economic dualism are discussed in regard to their implications for improving income distribution between agricultural and nonagricultural sectors and for agricultural development policy. These models, and especially that of Mellor-Lele, imply that as technology stimulates agricultural growth and the increased agricultural output that results is consumed by agricultural labor, there will occur a decrease in marketble surplus which decreases employment opportunities in the nonagricultural sector. What is needed, therefore, is a balanced-growth strategy emphasizing both agricultural development through technology and investment in the nonagricultural sector. In part two, the use of quantitative techniques to measure the effects of changes in the size distribution of income is examined. The total impact as reflected by the savings and demand effects on relative factor intensities due to changes in the composition of demand are discussed. The author recommends that migration to the urban sector can improve the marginal productivity of labor, so industrialization should be encouraged. To prevent an income gap between rural and urban areas from occurring, an agricultural development program should also be implemented. In part three, some recent attempts to measure the effects of technology and of various inputs, such as credit and technical assistance, are analyzed. Increased technological inputs increase farmer options in selecting low-cost production methods. The final section presents a dynamic multisectoral model of Guatemala used for measuring the effects both of technological change in the traditional agricultural sector and of a proposed land reform program. A bibliography containing 40 titles (1954–74) in both English and Spanish is also included.

AID/ta-BMA-2 931113402

076 PN-AAG-787

FERTILIZER MIXING PLANT FEASIBILITY STUDY

Frederick, M.T.; Smith, R.T.
1978, 94 p.

In August 1978, USAID/Bolivia requested that the International Fertilizer Development Center (IFDC) prepare a feasibility study for a fertilizer mixing plant in Bolivia. Emphasis was to be placed on an analysis of existing and potential fertilizer demand among small farmers. This document presents that study. After an overview of the Bolivian climate, soil, and crop production, current exploitation of Bolivia's major fertilizer raw materials is described. Next, the nation's infrastructure and its influence upon the farming sector are outlined, followed by a discussion of the present lack of an indigenous fertilizer industry and of future fertilizer manufacturing plans. Succeeding sections treat community development programs, extension services, current fertilizer patterns and consumption, the lack of soil testing facilities, the marketing and distribution of fertilizer, and the economic returns resulting from fertilizer. The IFDC draws several conclusions from their findings. The Bolivian campesino is well informed in the use and economic benefits of fertilizers. The potato growers in altiplano and Cochabamba are particularly sophisticated in their approach to crop fertilization. High fertilizer prices can be attributed to the pricing policies of the dealers, the imbalance of supply and demand, the lack of integrated government fertilizer programs and of importation controls on dealers, and the absence of preferential treatment for fertilizer imports. The resulting high prices and unavailability of fertilizer has inhibited demand. Costs can be decreased by employing money-saving business tactics and negotiation methods when importing fertilizer. An integrated agricultural program through a central agency would also be beneficial. The IFDC recommends a 6-phase program which moves from the importation of bagged fertilizers into a mixed system of bulk handling, blending, and bagging with future incorporation of indigenously produced fertilizers. Within this system, good business practices are essential. Tables and maps are presented throughout this document. A bibliography of 52 English and Spanish sources (1967–78) is included.

AID-511-165T

077 PN-AAG-997

REPORT ON POTENTIAL COLLABORATIVE INDUSTRIAL ENTERPRISES IN THE NEAR EAST REGION

Nathan Associates, Inc.
1979, 94 p.

Preservation of peaceful coexistence in the Near East may depend largely on the development of economic and financial ties between public and private business entities in Israel and its neighbors. In this connection, the present paper studies the potential of, and determines criteria for, collaborative industrial enterprises (CIEs) in the region. An overview of the status of industry in the Near East, focusing on unutilized or underutilized resources, marketing capabilities, and the potential effect of additional capital inputs, is first presented, followed by detailed accounts of industry in the economies of Egypt, Israel, Gaza, the West Bank, Jordan, Syria, and Lebanon. This review leads to the conclusion that considerable economic benefit could accrue to participants in CIEs. The nature and possibility of CIEs between these countries is then discussed and certain possibilities identified. Since the governments of the region control the ownership and operation of large construction and manufacturing enterprises, the possibilities for joint ownership and management would seem more likely for small- to medium-sized firms in the private sector. Despite constraints due to inadequate infrastructure, shortage of investment funds, limited natural resources, and competition from foreign markets, CIEs can be successful in the region if: (1) enterprises are carefully selected for availability of complementary inputs and products of high value and export potential; (2) supporting institutions, such as industrial parks in free trade zones near borders and special financial agencies to provide investment funds, are established in advance; (3) third parties participate, particularly in providing investment capital, as well as technical and other assistance; (4) governments of participating countries provide investment incentives and expedite necessary processes; (5) adequate infrastructure, such as communication and transportation facilities, and, even more importantly, skilled and experienced management, are available. A list of the most promising industrial subsectors for potential CIE's is included.

AID/afr-C-1134 GTS

078 PN-AAH-310

COOPERATIVES, INITIATIVE, PARTICIPATION AND SOCIO-ECONOMIC CHANGE IN THE SAHEL

Derman, B.
Michigan State University, Department of Agricultural Economics.
1978, 77 p.

Are the Sahelian peasants and herders, who have resisted change and refused to become market-oriented, irrational? Some theorists of development have reached that conclusion. Others take the viewpoint that there are a variety of paths to development, and that one should expect to find greater variability in the responses of rural peoples. The author of this report aligns himself with the latter viewpoint, emphasizing that the Sahel has never been an unchanging area. In fact, indigenous initiative is just as characteristic of the Sahel as stability and tradition. Examples include the introduction of new products such as the kola nut into the Central Sudan by the Wangara merchants, the spread of pastoralism, and the development of gardens by West Africans to meet the demand of Europeans for a variety of vegetables. In addition, the report focuses on the role of cooperatives and the degree of local participation generated by them. Experiences in Senegal, Mali, and Niger are related through quotations from a number of studies. The author concludes that cooperatives have not promoted the goal of increased equality and participation of the poor — instead, the hold of existing political and economic structures upon the poor has been intensified. The report includes footnotes and a bibliography (129 entries, 1952–78).

AID/afr-C-1260 625092600

079 PN-AAH-347

A REVIEW OF EMPIRICAL STUDIES OF DEMAND FOR AGRICULTURAL LOANS

David, C.C.; Meyer, R.L.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 38 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 2

Loan demand within LDCs is a growing economic activity and therefore merits greater understanding. This document is a review of recent loan demand studies from two perspectives: those concerned with loan demand projections; and those that quantify loan relationships. In part one of the review, a conceptual model is used to identify the commonly used factors which affect loan demand. Borrowing costs, investment options, and time consumption preferences are identified as the principle factors affecting farm-household demand. Technical improvements, high farm prices, greater factor endowments, and investment opportunities generally raise demand. Prices and technical changes which raise input levels or improve resource utilization will lower demand because they can be financed from increased savings. The authors contend that loan demand in LDCs should be based upon an interdependent production and consumption model. Farm production borrowing is the difference between desired investment levels and savings, while household consumption borrowing is the difference between present income and desired consumption. Savings are linked to income levels and investment options. In part two, loan projection studies are reviewed. In most LDCs, projections consist of calculating average production costs and then subtracting self-financing estimates and external funding. These proportions are judgemental and estimates are usually inconsistent with actual borrowing figures. Another method utilizes investments and historical capital inflows, yet most LDCs lack the required data for this kind of approach. Furthermore, this model is inappropriate for use in rapidly developing countries. It is recommended that structural relationships be clarified and that data on loan supply and demand functions be collected for improving these studies. Part three reviews economic and mathematical programming studies which determine loan demand relationships. Econometric studies use loan demand functions and derive demand elasticities from estimated profit functions to clarify these relationships. Mathematical programming studies analyze optimum enterprise mix, resource use, and farm income under simulated conditions. Only a few studies regarding LDCs have been done in this field. Forty-three bibliographic items (1966–78) are included.

AID/ta-BMA-7 931116900

080 PN-AAH-350

BARRIERS TO FINANCIAL REFORM

Vogel, R.C.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 31 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper, No. 5

Despite widespread agreement that rural financial reforms are needed in LDCs, arguments against the possibility of implementing such reforms are often heard. Four common arguments, all illustrative of existing barriers to financial reform, are analyzed here. One argument contends that reform would bankrupt many financial institutions. Raising interest rates to competitive market levels, particularly in LDCs experiencing rapid inflation, would force these institutions to pay higher short-term rates on deposits. Since rates on long-term loans could not be altered until after they mature, institutions would be caught in a financial crisis. The optimal control theory, which places ceilings upon loan and deposit rates and on monetary expansion, could be used to eliminate this problem, but is considered too complex to operate within LDCs. Raising rates on outstanding long-term loans is the best option, but its legality is questionable. This first argument is not considered strong because most institutions do not have their assets in long-term commitments. A second and better argument asserts that preferential loan rates for farmers are needed to compensate for other market distortions, such as low food prices and tariff barriers. But this viewpoint is weak also, because loans of this nature have concentrated on assisting wealthy farmers and not the majority of small farmers who need it. Also, the technical and infrastructural changes required to improve farming standards will not be influenced by these loan benefits. A third argument is that stabilization programs would be hurt over the short term by higher interest rates. Inflation could be reduced, but different sectors of production would be constrained. Both this argument and the final one, which considers the linkage between financial reforms and international economic policies, are stronger than those that precede and therefore need further investigation. The final argument is especially complex, since raising rates stimulates capital inflows which runs counter to economic objectives by raising the exchange rate and altering the balance of payments. A bibliography (1967–77) of nine English and Spanish sources is included.

AID/ta-BMA-7 931116900

081 PN-AAH-352

FINANCING THE BEGINNING FARMER: TOWARDS MORE REALISTIC FARM PURCHASE LOAN REPAYMENT ARRANGEMENTS

McClatchy, D.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 42 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 7

Increasing capital requirements are causing a financial entry problem for beginning farmers purchasing land. This paper suggests a solution to this problem by identifying the underlying reason for it. Two sides to the financial problem facing young farmers are distinguished. There is the structural side, namely the continuing increase in the capital value of farms in real dollar terms. Attempts by financial institutions to solve this part of the problem by making more farm real estate mortgage credit available have met with meager response from farmers. The reason for this, in the author's view, is that nothing has been done about the other, institutional, side of the problem: the general requirement that farm mortgage loans be serviced by annual or even more frequent payments so that the loan can be fully retired within 20-30 years, in short, by the time farmers are ready to retire. Thus, farmers can borrow only what they can repay within a farming lifetime. The author considers this difficulty one of timing; specifically, an inconsistency between the timing of the economic returns to the farm purchase investment through capital gains and the annual net rental income, and the required schedule for repaying the mortgage credit available to finance this investment. In short, loan repayments eat up capital gains. A review of empirical evidence over the last two decades suggests that the timing of capital gains makes such gains totally unsuitable for servicing conventional farm real estate mortgage loans. Thus, the average farmer is only justified in borrowing more than half of the farm purchase price to the extent he is willing to contribute some of his normal labor and management return and other income towards servicing a larger loan. It is concluded that the most promising solution to the entry problem (without recourse to subsidies) lies in incorporating more flexibility into the terms and conditions of repaying farm mortgage loans. Several policy alternatives are noted, as is the need for research into their potential impacts and institutional drawbacks. Illustrative tables and charts, footnotes, a 26-item bibliography (1954–78), and two technical appendices are included.

AID/ta-BMA-7 931116900

082 PN-AAH-353

IDENTIFYING FUTURE FARM TRANSFER CREDIT REQUIREMENTS: A CANADIAN STUDY

Tung, F. Jones, W.D.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 20 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 8

Canada's farming sector is becoming increasingly dependent on credit as a source of investment and operating capital. This paper projects 1981 credit requirements for the transfer of farm real estate and examines the implications of this projection for the agricultural sector. In the first of three sections, the components that determine farm transfer credit needs are discussed, followed in the second section by a description of the forecasting model used by the authors. The third section presents the forecasted results derived from the model together with their implications. Transfer credit needs were determined by the number and size of transfers regarding both new and expanding farmers. These figures were then calculated along with the prices of real estate. Internal financing was subtracted from total funding transfer requirements to determine credit demand. The forecasting model is composed of three elements: transition probabilities, the number of possible entrants during the project period, and farm size. Forecasts indicate an increase of transfer capital and credit requirements of 4% over the 1976–81 period. Farm transfer estimates for the 1976–81 period shows a reduction of farmland expansion and an increase in new farm entrants. The authors suggest three possible implications of these projections. First, that a majority of Canadian farms are reaching their maximum viable size, given their present technological levels. Second, that a limited supply of real estate is available for current expansion needs. Finally, that alternative means of entering the farm industry, such as part-time farming, are attracting more individuals into the industry. Increases in capital and credit requirements indicate that new farmers will find it difficult to meet equity requirements for loans on farm land. Raising farm values will mean that new farmers will need increasing financial assistance. This may result in the formation of farm cooperatives or tenant farming. The cost of using capital will also increase, affecting the industry's market position and the need for government support. Two appendices containing data sources and statistics are also included.

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083 PN-AAH-354

SECTORAL DEMAND FOR CREDIT AND CREDIT POLICY (CHILE)

Cuevas, C.C.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 14 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 9

In Chile, the use of agricultural credit has not aided sectoral development. This document analyzes the causes of this problem by discussing the behavior of agricultural credit for the period 1965–77, with particular emphasis on the period 1974–77; and by comparing sector credit demand with credit supply and the gap between the two, as well as the form in which credit is supplied. In Chile, institutional credit supplied for operational and investment needs by commercial banks, specifically the Banco del Estado, has been the farmer's main source for loans. Since 1965, operational loans have averaged 80% of the total demand. Investment loans have been smaller, peaking at 25%. In 1976, operational credit was linked to the consumer price index and the real rates assessed to cover farming input costs and social security payments averaged 16% per annum. Wages and salaries had to be funded from the farmer's own resources or from regular banking facilities which commanded high interest rates. Even though investment credit rates are presently between 10-16%, this credit is seldom accessed by small farmers because of the heavy collateral guarantees that are required. For this reason, total farming investment has been low. Since 1974, farming protection has increased relative to other sectors, yet the profitability of the traditional farms is low and therefore must be funded from other sources. Traditional crops account for 80% of the cultivated land in Chile and profits are low. If resources were reallocated into cattle or fruit farming, rates of return would increase. Traditional farmers have not altered their methods because this would require an investment, with collateral requirements, that they could not obtain. Foreign competition and credit policies have deterred farmers from using credit, from purchasing farming inputs, and from pursuing labor-intensive activities. As a result, operational credit demand between 1976 and 1977 was 40% above actual borrowing. Foreign credit restrictions have been reduced, which will provide added funds and lower rates. Measures to provide state guarantees for farmers in need might enable more farmers to acquire loans.

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084 PN-AAH-355

OPTIMAL FUNDING STRATEGIES FOR FINANCIAL COOPERATIVES

Tauer, L. Boehljie, M.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 32 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 10

The cooperative Farm Credit System (FCS) was established with the purpose of improving the income and well-being of U.S. farmers and ranchers by providing a source of sound, adequate, and constructive credit. As a member of the FCS, a district Federal Intermediate Credit Bank (FICB) serves as the intermediary between national sources of money and local Production Credit Associations (PCAs) and other qualified financial institutions within that district. The objective of this study was to develop a liability management model to aid in the debt management decisions of a FICB. In this instance, the model was applied to the debt selection process faced by the Omaha, Nebraska FICB. The analysis was structured to determine the optimal borrowing activities that would minimize the expected cost of credit at various levels of cost variance. In addition, optimal (in terms of minimum cost at various levels of cost-risk) maturity distribution and time issuance of debt instruments were determined for a multiperiod planning horizon. A planning horizon of 3 years (1979–81) was chosen — permitting an analysis of the impact of sequential funding with discount notes, and 6- and 9-month bonds. Longer-term bonds would have required a substantially longer planning horizon. With the use of an inventory model, it was possible to estimate the optimal bond purchases for the selected time period given an estimate of probable demand, cost of bonds, cost inventory (funds) deficits, and return from excess inventory balances. Analysis revealed that extensive use of both long-term bonds and discount notes is called for. The 6- and 9-month bonds are very similar with regard to expected costs, variance-covariance and duration. It therefore appears that they are good substitutes for each other, depending upon funding needs of the bank and relative costs. The authors conclude that this model is a useful day-to-day management aid in analyzing liability structures. A bibliography is included (17 entries, 1959–79).

AID/ta-BMA-7 931116900

085 PN-AAH-356

MOBILIZATION OF RURAL SAVINGS: THE CASE OF THE SUDANESE SAVINGS BANK

Auri, A. Mottura, P.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 22 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 11

The Sudanese Savings Bank (SSB) was established in 1974 to promote Sudanese socioeconomic development. Various aspects of its institutional growth are discussed in this document. Overall SSB deposits have grown due to local government and Central Bank support, branch evening hours, trained and locally known staff, and rural location and lending policies. Deposit growth is seasonal, decreasing during July and August. Both savings and investments accounts provide benefits not available in commercial banks. Savings accounts have grown since 1975, due to an 8% rate of return, a low opening account requirement fee, a policy allowing unlimited withdrawals, and the savings box concept. These deposits have been attractive to middle- and upper-income savers, particularly in individual accounts. Time deposit 12-month investment accounts with a 9% interest rate are also offered, and while not as successful as anticipated, they are growing in popularity. Lack of success could be due to the psychology of local savers and the fact that the account only offers a 1% increase over normal deposits. Data on SSB current accounts, which are the same as offered elsewhere, are mixed. On the whole, it appears that the SSB is specializing as a savings deposit collector as intended. Innovations used by the SSB include night service, savings stamps, certificates of value, publicity programs, and the Mobil Unit Service (MU). The MU, which is discussed in some detail, has opened 12.3% of the total deposits and collected 0.27% of SSB's balances. This is below expectations. Further, MU attempts to increase investment and current accounts have not succeeded. Uncertainty surrounding the MU exists, because funds are frequently unavailable as compared with normal deposits. In conclusion, the SSB has done well during its initial period, encouraging customers with no previous banking experience to use its facilities. High MU costs are balanced by its research and promotional activities, noninterest bearing deposits are low, and liquidity requirements may inhibit an increase in loan-to-deposit ratio.

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086 PN-AAH-357

THE FUNDING PROBLEM IN RURAL DEVELOPMENT BANKS WITH EMPIRICAL REFERENCE TO THE JAMAICA DEVELOPMENT BANK

Bourne, C.; Graham, D.H.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 22 p.

Prepared for the Second International Conference of Rural Finance Research Issues, Paper No. 12

The funding problem confronting Rural Development Banks (RDBs) has been neglected by contemporary analysts. This document studies the funding of these banks with empirical reference to the Jamaican Development Bank (JDB), in order to explain their credit operations and to identify those factors that determine financial growth. This paper is divided into four sections. The first describes the main sources of RDB funding, while the second examines their short-term implications. The third section outlines bank inflows over the long-term, while the last examines three ways of relieving bank funding problems. RDBs are very dependent on local governments and external agencies such as the World Bank for their funding. Local private institutions and loan repayments to RDBs have not been significant. Between 1970 and 1977, the JDB, for example, received 23.6% of its funding from external sources and 52.4% from its own Government. The conditions imposed by these two main lending bodies are restrictive. Foreign restrictions include: (1) forbidding RDBs from conducting any working capital loans; (2) defining target groups for their loans; and (3) maintaining a preference for single crop, long gestation projects. These measures are biased towards large farmers and force other borrowers to rely upon internal financing over the short term, which decreases their liquidity. Interest rate policies which RDBs must repay and exchange rate exposure also jeopardize their efficiency. Government source loans are directed, on the other hand, towards small farmers and require concessional interest rates that compromise distributive equity and create high per-unit administrative costs. Also, these loans have short maturities which reduce the loanable capital of RDBs. RDBs are therefore not free to select individual projects which best suit their own lending ability. Because both sources also pose a long-term danger that they can and will be reduced, funding sources should therefore be broadened. Three possibilities that are briefly discussed are deposit mobilization, bond issues, and earmarked taxes. The first two are preferred, yet they must be instituted early and RDBs must demonstrate a financial program which engenders confidence to attract these funds. A bibliography of eight sources (1971–78) is included.

AID/ta-BMA-7 931116900

087 PN-AAH-358

INTEREST RATE, TRANSACTION COSTS, AND FINANCIAL INNOVATIONS

Bhatt, V.V.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 42 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 13

Fragmentation of the capital market — that is, the phenomena of different markets for different "products" — as it occurs in the LDCs is generally attributed to high interest rates. The crucial variable in determining these rates is transaction costs (both administrative costs and default risk). Financial innovations (changes in production and consumption functions, introduction of new goods and services, changes in organization and market forms, etc.) reduce these costs and thus lower interest rates. The economic history of Europe and the United States is a progression of such innovations — the most recent of which is U.S. department store banking. Should LDCs pass through the same stages of financial development or should they adapt existing structures to their own specific needs? The author suggests the latter, with the remainder of the document describing the evolution of a credit market in the State of Haryana in India and the innovation of the Syndicate Bank of India. In 1964, the State of Haryana was one of the three states in India to adopt new high-yielding seeds. As a result, wheat production per acre almost doubled in less than a decade. Traditionally, agricultural credit in that state had been provided by local traders, who purchased the farmer's surplus output. However, with the new prosperity, medium-sized farmers were able to use their surplus profits for lending to small farmers, driving the traders out of business with lower interest rates (15-25% per annum vs. 30-40%). The reason for the farmers' success was smaller transaction costs — they were simply better able to appraise the income potential of the small farmers. The Syndicate Bank of India is the story of a small bank seizing an area of banking (servicing small- and medium-sized enterprises in the provinces) considered unprofitable by the nation's larger, urban establishments, and introducing new "products" and processes to make it profitable. With these examples, the author emphasizes the need to move away from the usual discussion of interest rates based on "factless theorizing" and the macro approach to monetary and banking analysis. Footnotes and statistical charts are included in the report.

AID/ta-BMA-7 931116900

088 PN-AAH-359

BANKING INNOVATIONS IN INDIA: A CASE OF GROUP LENDING FOR AGRICULTURE

Desai, B.M.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 31 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 14

In order to increase the flow of agricultural credit to small farmers, many banks in India have introduced the innovation of group lending. The present paper reports on a limited pilot study of group lending by one bank branch in India. The study was undertaken to develop an analytical framework to determine equilibrium (supply=demand) conditions under which group lending can be considered an innovation, and to provide empirical evidence on the potential advantages or disadvantages of this innovation. Potential advantages and disadvantages of group lending for both supply and demand are distinguished. Examples of advantages are lowered transaction costs for both borrowers and lenders. Examples of potential disadvantages are increased costs of forming groups in reference to supply, and loss of individual discretion in regard to demand. Two analytical models, one with, the other without potential disadvantages, are constructed, and necessary and sufficient conditions for considering group lending an innovation are distinguished. A necessary condition is that the net demand or supply shift is greater than zero. A sufficient condition is that when the combined shift in both supply and demand is greater than zero, the net demand shift is greater than the net supply shift, or vice versa. From the cases studied, it is concluded that for group lending to be an innovation, both necessary and sufficient conditions must be justified simultaneously. It is further concluded that when the combined net shift in supply and demand is less than zero because of decreased supply, it is critical for banks to mobilize as large a demand advantage as possible. When, however, the combined shift is less than zero due to decreased demand, then an enlargement of the supply advantage is called for. These conclusions are considered valid as long as interest rates are kept flexible, rather than rigid. On the empirical level, data showed that group lending has a potential for both demand and supply advantage, the latter due to lower default risk. This conclusion is due to the fact that distance and technology factors accounted for a large proportion of differences between group and mortgage borrowers.

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089 PN-AAH-360

INNOVATIVE SMALL FARMER CREDIT IN NICARAGUA

Tinnermeier, R.L.; Gonzalez-Vega, C.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 31 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 15

Credit has been a major component of agricultural and rural development in LDCs. This document reviews the innovative steps taken in Nicaragua by the Institute For Campesino Development (INVIERNO) to provide credit for low-income farmers. INVIERNO provides a set of integrated services directed towards local needs by dispatching teams composed of an agricultural technician (AGROMOC), an input and marketing specialist (CREDOMERC), and a community specialist, to the local Devel-

opment Center (CEDE). Much of INVIERNO's success has been due to cutting loan costs. In the field, AGROMOCs personally ascertain the needs of local residents and distribute loan applications accordingly. Applications are processed electronically, which reduces administrative costs, reduces human error, and releases CEDE personnel for other duties. Computerization, while helpful, does create problems between stations involving communication, data transfer, and coordinating data activities. INVIERNO also introduced the policy of granting credit for 5-year periods which has cut costs, since annual applications are avoided and single accounts are kept for each borrower rather than having an account for each loan operation. Group lending may further reduce costs. Considerable emphasis has also been placed on raising small farmer incomes through the adoption of new technology. Various technical packages are offered by the AGROMOCs to farmers depending upon the farmer's knowledge of credit for purchasing modern inputs. INVIERNO has been able to pursue these policies due to the quality of its management system. A competitive salary scale, liberal fringe benefits, and effective selection system have been instrumental in establishing a competent staff. Planning has a high priority, which keeps goals and approaches clear and up to date. Department and Division heads keep track of project activities and objectives, and internal and external INVIERNO evaluations are made regularly. INVIERNO has coordinated its services with other agencies to expand its outreach. In all of its programs, credit is supplied first and other services are provided accordingly. A bibliography of 28 English and Spanish language sources (1973–78) is included.

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090 PN-AAH-361

THE IMPACT OF RURAL CREDIT ON PRODUCTION AND INCOME DISTRIBUTION

Sayad, J.
Ohio State University, Department of Agricultural Economics and Rural Sociology.
1979, 33 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 18

Many LDCs have used rural credit as an incentive to promote investments in their agricultural sectors. Using examples from Brazil, this paper analyzes the effectiveness of these policies and their impact on income distribution. First, the institutional and economic environment of Brazil is outlined and then a model is presented through which rural credit is analyzed. Next, the impact of these credit programs on income distribution is discussed. Empirical evidence and a summary of results conclude this report. In Brazil, agriculture is considered a high priority and economic policy continues to rely upon subsidized interest rates to induce farming investment. Brazilian officials contend that this policy allows them to control domestic prices over the short term, while simultaneously improving the growth outlook for the farming sector, which will attract private investment. The author suggest that this is an incorrect approach. He claims that borrowers will always allocate their investment resources in those areas where the highest rates of return are available. Farmers will accept these concessionary loans, but they will transfer a maximum amount of their investment funds to the most profitable enterprises. Due to import controls, which increase farm input costs, and price controls, the agricultural sector does not always promise the highest return. The substitution effect for alternate investments must also be considered. Here the effectiveness of credit policies in determining where investments will be directed depends upon such borrower characteristics as farm size or profitability. Credit programs in Brazil might be more effective if higher financial transaction costs, which would inhibit the attractiveness of alternative investments, were established. Concerning income distribution, the author contends that commercial banks prefer to supply a larger share of rural credit to borrowers that represent the smallest possible risk. These are also individuals who have the lowest transaction costs for alternative investing. Therefore, the wealthy large farmers benefit the most from these policies, which in fact increase income disparities. A bibliography of 14 English- and Spanish-language sources (1956–79) is appended.

AID/ta-BMA-7 931116900

091 PN-AAH-362

A MODEL OF THE POLITICAL ECONOMY OF AGRICULTURAL CREDIT: THE CASE OF BOLIVIA

Ladman, J.R.; Tinnermeier, R.L.
Ohio State University, ,Department of Agricultural Economics and Rural Sociologyd Rural Sociology.
1979, 41 p.

Prepared for the Second International Conference on Rural Finance Research Issues, Paper No. 19

Agricultural credit has traditionally been the cornerstone of most agricultural development programs in LDCs. This document contends that although these programs are economically oriented, they are also used as an instrument for consolidating political support. A model of the political economy of agricultural credit is examined and applied to Bolivia. Conclusions and policy implications are then drawn. The model demonstrates that under typical LDC conditions of direct government control of financial institutions, concessionary interest rates, defaulting, and inflation, credit is used for both economic and political reasons. The Bolivian case clearly illustrates this point, especially during the period between 1970 and 1978 following a military coup supported primarily by the private business and large commercial farming sectors of Santa Cruz. Following the coup, concessionary agricultural credit to this area rapidly increased. The Agricultural Bank of Bolivia (BAB) increased its loans to this region to a level five times greater than that existing during the 1960's. The Bank's concessionary rates in 1973 were 15% below rates charged for other commercial loans. This situation was not new for the BAB. Since 1942, it has been assaulted by foreign critics charging that political loans had harmed the Bank's financial standing. In an attempt to alleviate this problem, the BAB has been reorganized four times. Finally, in 1979, the BAB was declared bankrupt due to loan defaulting, with 80% of the delinquencies coming from the Santa Cruz region. After 1976, another bank, the State Bank

(BDE), which had been directing 60% of its loans towards agriculture, attempted to eliminate political lending from its activities. Both banks are government controlled. Foreign donors have contributed to the bank by promulgating concessionary interest rates and by covering bank losses caused by defaulting. Decreasing defaults through legal means is the best way to correct this problem, since raising rates has major political costs. A bibliography of 18 Spanish and English language sources (1966–79) is included.

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092 PN-AAH-421

HUMAN LABOR USE IN EXISTING AND PROSPECTIVE TECHNOLOGIES OF THE SEMI-ARID TROPICS OF PENINSULAR INDIA

Ghodake, R.D.; Ryan, J.G.; Sarin, R.
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).
1978, 69 p.

In Economics Program, Progress Report No. 1

Labor is a key resource in the developing world — especially in the semiarid tropical (SAT) regions, where more than 500 million poor eke out a living. The purpose of this study was to determine the effect of newly developed land, water, and crop management technologies on existing labor patterns in a SAT region, in this case peninsular India. ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) based its study on six villages, detailing the use of family and hired labor by 30 farmers in each village. Interviews were conducted every 2-3 weeks throughout 1975-76. The sample households were selected using stratified random sampling, with small, medium, and large farms represented equally. Topics covered in this report include labor patterns and the size of the farm, composition of labor (male/female, family/hired workers), seasonality of labor use, regional labor patterns, and labor patterns with the introduction of watershed-based technologies. For the most part, there was found to be an inverse relationship between farm size and total labor use (family and hired) per unit of land. Increased labor use by small landholders may be accounted for in one or more of three ways: (1) an increase in the intensity of cropping; (2) adoption of a more labor-intensive cropping pattern; and (3) greater use of labor per hectare under individual crops. There was a positive correlation between hired labor and farm size. With increasing prosperity, many members of wealthy families tended to drop out of the labor force — particularly women and children. Nevertheless, the extent of labor hired by small farmers was by no means insignificant. Authors conclude that the area's existing irrigation systems (tank and well) have tremendous employment-creating potential, and that the introduction of new technologies would result in competition for labor at strategic times in crop-growing seasons. Report includes a bibliography (43 publications, 1956–78).

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093 PN-AAH-490

JOBS FOR WOMEN IN RURAL INDUSTRY AND SERVICES

Dixon, R.B.
1979, 58 p.

Prepared for an Food and Agricultural Organization (FAO) Reform and Rural Development

Increasing landlessness, in combination with other economic and demographic forces such as increased mechanization and declines in farm size and productivity, has created a compelling need in most LDCs to expand nonagricultural employment in rural areas. Since women are more vulnerable to land eviction, earn less, and are more likely to be unemployed than men, rural development and agrarian reform policies are needed to design support systems to raise the productivity of female labor; to transform subsistence activities into income-generating ones; and to create new employment opportunities for women. This paper provides statistics on female labor in 56 countries and proposes strategies for mobilizing rural women for employment. Women constitute 20% or less of the paid labor force in 20 of the 56 countries; as low as 4-5% in some countries. This underrepresentation perpetuates their economic and social dependency and retards development. Strategies for expanding nonagricultural employment for rural women are twofold: (1) national measures to promote investments in rural areas, encourage rural economics diversification, and correct other economic imbalances undermining rural development; and (2) grass roots measures to organize employment for rural women in nonagricultural production, sales, service, and administrative/professional positions. The report concludes with a 6-step strategy to create employment for rural women: (1) identify groups of women who most need income-generating employment; (2) define the range of women's economic activities with a view toward raising their output and income-generating capacity; (3) locate indigenous social networks around which they could be mobilized; (4) establish sources of credit, technical assistance, and training; (5) determine technological needs to reduce domestic burdens; and (6) identify and overcome other cultural and structural obstacles that deny women control over the products of their labor. Footnotes and a 103-item bibliography (1965–79) are appended.

AID/otr-147-79-52

094 PN-AAG-831

THE IMPACT OF 25 TELEVISION PROGRAMS ON "WATER", PRODUCED AND BROADCAST BY THE IVORIAN OUT-OF-SCHOOL EDUCATION PROJECT

Lenglet, F.
1976, 108 p.

Supplemented by PN-AAG-832

In an attempt to help villages of the Ivory Coast deal with the water supply problem, especially during the dry season, the Ivorian Out-of-School Education Department (OSED) broadcast a series of 25 TV programs on water and related issues during the period November 1974 to December 1975. This report evaluates the reach and impact of these programs, which constitute one element of a massive Ivorian Government information and education campaign on hygienic and sanitary measures and the use of drinking water. After a brief introduction, the research design and the evaluation methodology are outlined. Next, a discussion of the content of the 25 water programs, their development, and their outreach is presented. The programs dealt with the basic problems of water supply, quality, and pollution, the relationship between contaminated water and disease, and the various possibilities and means to obtain safe(r) drinking water. Three types of objectives were pursued by these programs and by discussion sessions led by local animators following each broadcast: (1) sensitization and information; (2) understanding and learning; (3) incitement to action. The water programs reached a considerable audience varying from 3,500 to 31,200 spectators per program. Following this, the impact of the program is discussed. The water programs created awareness of problems related to water and of solutions for the issue of a safe water supply. It is certain that people acquired new knowledge about health practices and started implementing them. The major obstacles to a real impact of the "water series" lie in the lack of local organization, the lack of access to material and organizational resources at the local level, the lack of cooperation of the administrative authorities, the lack of communication support, and the strength of traditional customs and beliefs. Finally, a summary and conclusions are presented. The authors recommend that the number of communal actions proposed in the TV programs be limited; that appropriate ministries, agencies, and private organizations cooperate more actively in program preparation and follow-up; and that the OSED promote the creation of local Tele-Clubs as a nucleus of development actions.

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095 PN-AAG-832

VISITS TO TWENTY-THREE VILLAGES TO DETERMINE THE IMPACT OF THE WATER SERIES PRODUCED BY THE OUT-OF-SCHOOL TV DEPARTMENT

Grant, S. Pierre, S.T.
1975, 97 p.

Supplemented by PN-AAG-831

In an attempt to help villages of the Ivory Coast deal with the water supply problem, especially during the dry season, the Ivorian Out-of-School Education Department (OSED) broadcast a series of 25 TV programs on water and related issues during the period November 1974 to December 1975. This report analyzes how the school animators, who run the adult educational television (ETV) discussions, and villagers react to such series broadcasts. The water programs represented the first Ivorian adult ETV series. Both mailed questionnaires and interviews with animators and selected villagers in 23 villages were used in the analysis. Major problems relating to the programs include the lack of lighting and space in the animation classrooms; the lack of understanding of program contents; irregularities of the broadcasts (due mainly to frequent animator reassignments, long technical breakdowns, and modification of broadcast times and program subjects); failure of the animators to adequately communicate program times to the villagers; the practice of viewing ETV programs outside of the animation sessions, thus missing the ensuing discussion which is supposed to promote learning and related community or personal action; lack of ethnic balance in the programs; lack of relevance in ETV topics; the lack of pay for animators; the lack of interest in ETV on the part of village leaders; the lack of village visits by OSED staff; cultural/traditional barriers making the school teacher a very ineffective and inappropriate animator; and lack of cooperation of the appropriate government agencies in program preparation and follow-up. Suggestions for improving these situations are included in each case. Recommendations were made to the OSED in 11 different areas, including assisting villagers in contacting appropriate government agencies and offices; performing field demonstrations to augment the TV programs; furnishing kerosene lamps to animators; maintaining a stricter schedule for broadcast dates and times; obtaining a more equitable distribution regarding the ethnic group and language of the program actors; and responding more quickly and more satisfactorily to questions asked by the spectators and animators.

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096 PN-AAG-833

"TELE POUR TOUS" IN RURAL IVORY COAST: AUDIENCE, IMPACT, PERCEPTIONS, REPORT OF TWO SURVEYS CONDUCTED IN JANUARY AND APRIL 1977

Etaix, M.; Lenglet, F.
1977, 250 p.

The Ministry of Primary and Television Education of the Ivory Coast produces a series of nonformal education broadcasts entitled "Tele pour Tous" (TV for Everyone — TPT). This report discusses the results of two surveys designed to assess the impact of TPT programs on rural audiences. After initial chapters explaining the research objectives, outlining the survey methodologies, and describing the characteristics of the sample villages and individual respondents, the central issues of TV watching in general and TPT viewing in particular are discussed. At present, only about 10% of the rural adult population is exposed to the TPT programs, and a large number of these TV/TPT spectators are likely to be more interested in general TV programs than in the TPT programming. The surveys showed that there is no significant regular TPT viewing audience and that even when the village schools are open, have TV sets, and attract villagers to the TPT programs, little of the discussion (animation) which is supposed to follow such programming is adequately conducted. The animation sessions are characterized by a formal primary school pedagogy which does not induce collective decisionmaking or action. This last point forms a partial explanation for the lack of impact discussed in chapter six. Important characteristics of TPT broadcasts which positively influence viewer sensitization are (1) relevancy for the potential audience; (2) attractive form with which the spectator can identify; and (3) a large number of broadcasts and/or reruns in a sequential order. However, data show that even with sensitization, few actions ever result from watching and discussing TPT programs. Chapter seven discusses the fact that almost all of the TV/TPT spectators have a positive attitude toward TV as a medium of instruction. Finally, the authors conclude that the Ivorian educational television project works, though minimally and inefficiently. Eleven recommendations are made on reorganizing TPT programming, increasing interest in TPT, and reorganizing the reception structure. Thirteen appendices on various project-related topics and a 29-item bibliography of French- and English-language references (1966–77) are included.

AID/afr-C-1158 698038300

097 PN-AAG-834

RURAL ADULT EDUCATION AND THE ROLE OF MASS MEDIA: A COMPARATIVE ANALYSIS OF FOUR PROJECTS

Lenglet, F.; McAnany, E.G.
1977, 66 p.

Many rural adult education projects use modern mass media as an important component. This paper is a follow-up to an effort to assist decisionmakers in the Ivory Coast in evaluating the Out of School (nonformal) Educational Television (OSTV) program. This paper compares the OSTV program with the Radio Study Campaigns (RSCs) in Tanzania, the Radio Schools of Santa Maria (RSMs) in the Dominican Republic, and the Nonformal Education Module in Guatemala. The paper begins with a short examination of the external or social benefit of rural education programs in general (as opposed to the internal benefit to the individual participants) and the reasons why programs with mass communication elements have received so much attention within the LDCs. The authors contend that the extension of education/information/communication systems must be understood as a form of state intervention which is not only development oriented, but also political and ideological. The next section provides brief descriptions of each project and a comparative analysis of these projects based on seven categories: objectives; organization; selection and training of personnel and recruitment of participants; uses of media technology; feedback and evaluation systems; effects and impact; and internal and external constraints. In terms of internal effectiveness, the authors classify the four projects in terms of the proportion of their target group reached and the impact of the programs on their audience. They consider external effectiveness to be a more important consideration, however, since all four projects are intended to attain other than immediate educational or informational objectives. The Tanzanian RSCs serve to create a permanent state of ideological awareness and mobilization to combat the causes of unemployment. The Ivorian OSTV's indirect political effect is judged to be more important than its direct educational effect. The Dominican RSM's external effects could be negative, increasing both the likelihood of a rural "brain drain" and of exacerbated urban unemployment and downward pressure on urban wages. A 44-item bibliography of English-, French-, and Spanish-language references (1967–77) is included.

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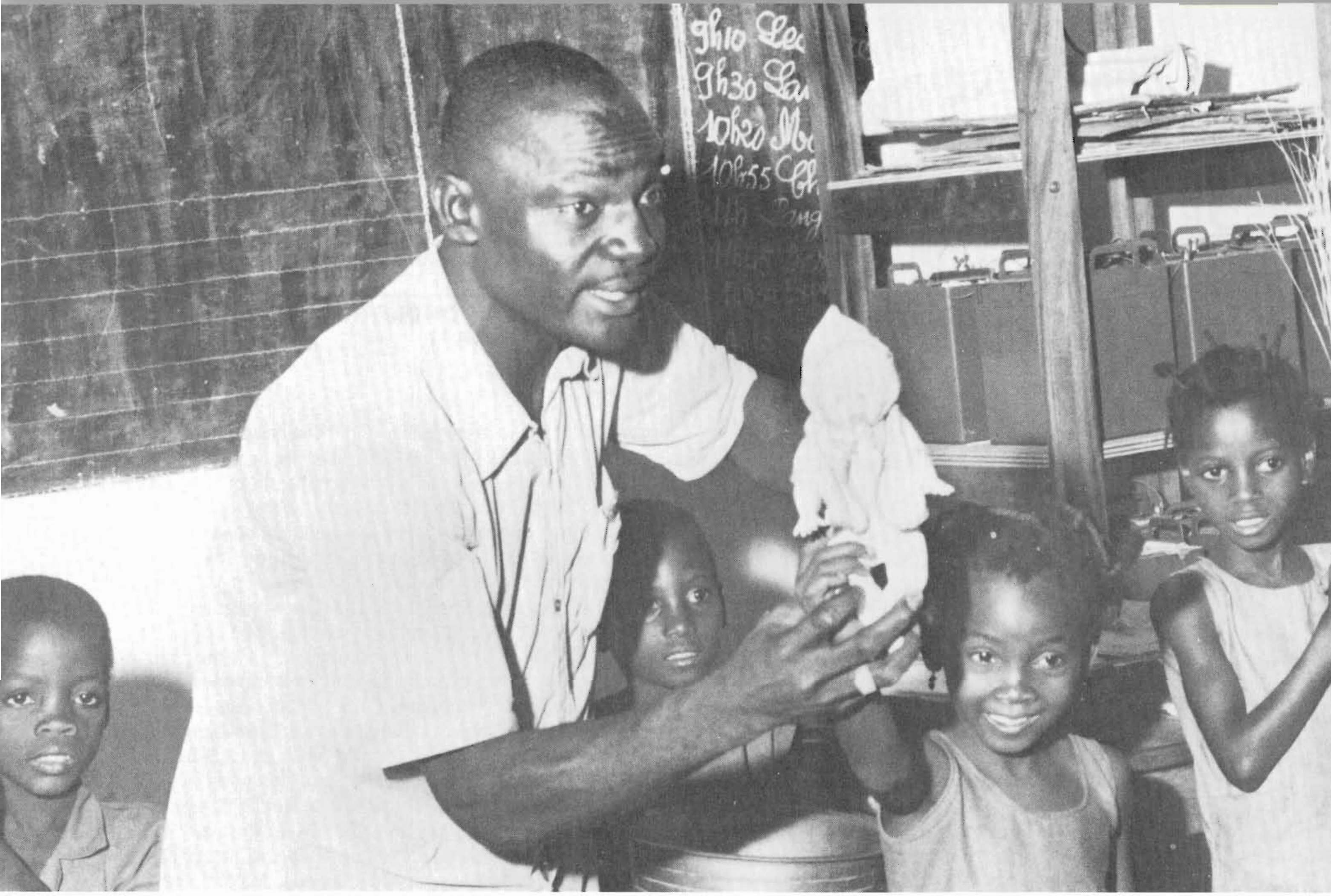
098 PN-AAG-835

THE RECEPTION AND ANIMATION OF OUT-OF-SCHOOL EDUCATIONAL TELEVISION PROGRAMS IN THE IVORY COAST: A CAST STUDY OF FOUR VILLAGES

Beneveniste, A.
43 p.

Rural animation, as a global approach to development, necessarily includes the three successive states of informing the public, educating the public, and organizing the public for action. This report represents an English summary of a French-language study to describe qualitatively the global animation process as applied in the Ivory Coast. It is based on four village case studies, and assesses public awareness of, opinions about, and reception of the Ivorian "Tele pour Tous" (TV for Everyone — TPT) nonformal education broadcasts and their degree of congruence with the sociocultural realities of each village. After a general introduction to rural animation in the Ivory Coast and a discussion of the study's methodology, case studies of four "animated" villages are presented. In each case, discussion is structured around four main areas: the flow of information in the village about the TPT broadcasts; the external and internal factors influencing public interest



A rural "animator" reinforces instructional TV lessons to Ivory Coast school children.

and attendance; the typical operation of a single TPT broadcast; and the comprehension and acceptance of the broadcast messages. According to the results of the survey, it is probably safe to say that less than 5% of the total population in these four villages had ever seen a TPT broadcast and that, in general, those who had been spectators have no social or political power in their villages. In all four villages observed, there was very little organized effort to make sure that the villagers knew about the occurrence of the TPT broadcasts and understood the scope and reasons for this program of nonformal education. The use of schools as a locale for the meetings and the use of school teachers as animators insured the failure of the program as a model of community activation for innovation or development, as teachers in the rural regions are seen as having no influence on matters external to the school. The author concludes that such broadcasts will remain but a marginal force in the task of rural animation until such time as they reach those in the village who have the social or political power needed to make decisions or initiate activities.

AID/afr-C-1158 698038300

099 PN-AAG-836

COST ANALYSIS OF NON-FORMAL ETV SYSTEMS: A CASE STUDY OF THE "EXTRA-SCOLAIRE" SYSTEM IN THE IVORY COAST

Klees, S.J.
1977, 127 p.

The Extra/Scolaire (E/S) educational television (ETV) system of the Ivory Coast produces television programming dealing with a wide variety of topics concerning agriculture, politics, economics, and culture, directed primarily toward rural adult audiences. This paper summarizes and analyzes the societal costs incurred by the E/S system. An introductory section presents the assumptions and limitations of the "opportunity cost" approach to cost analysis and describes the structure of the E/S system, the context in which it operates, and the extent to which it is utilized. The second section provides a specific estimation of the costs of the various E/S system components: administration, program production, program transmission, support materials production and distribution, program reception, and system evaluation. The estimate is based on data for the 1975-76 operating year, including amortized start-up and capital costs. Costs are estimated under two broad alternative assumptions reflecting in part the difference between building upon existing formal school system ETV capabilities (the Ivorian case) and starting from scratch (the international audience perspective). Aspects of the E/S system which may entail social costs not captured by monetary price measures are also considered. Section three translates this annualized cost description of the E/S system into cost function terms in order to view the potential cost impact of various policy decisions. The authors found the marginal costs of expanding the proportion of repeated broadcasts, the training given to animators (discussion-leaders), the production of support materials, and the evaluation effort to be low relative to total costs. They recommend that such options be pursued if they are deemed to yield significant social benefits. The authors conclude by indicating that some observers view the Ivorian E/S system as a straightforward provision of useful information to rural adults, while others question whether its passive instructional mode and lack of an integrated accompanying infrastructure can really aid in Ivorian rural development. Various appendices and a 35-item bibliography of French- and English-language references (1966–77) are included.

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100 PN-AAG-837

AN ADMINISTRATIVE HISTORY OF OUT-OF-SCHOOL EDUCATIONAL TELEVISION IN THE IVORY COAST

Grant, S.
1977, 104 p.

The Out-of-School (nonformal) Television (OSTV) program of the Ivory Coast is producing a series of educational broadcasts entitled "Tele Pour Tous" (TV for Everyone — TPT). This study examines the basic organization, management, and evolution of the department producing the TPT broadcasts. An initial chapter describes the methodology of this study, and mentions five similar studies which might interest the reader. Basic background information on the TPT project is presented in chapter two, with sections on target audiences; general program objectives and policies; film production, transmission, and reception; content and type of TV programs produced; collaboration with government agencies; and financing. Chapter three, which contains the report's principal analysis, examines in detail six key decisions regarding the OSTV program and their consequences. Conclusions consequent upon this analysis are presented in the fourth chapter as follows: (1) It has been an uphill battle to place and maintain the out-of-school department in prominent national visibility. (2) Collaboration with other development institutions in designing, producing, and promoting out-of-school films has shown many indications of breaking down. (3) and (4) Both the use of television as the principal communications medium and the practice of broadcasting in the French language have decreased the potential reach and impact of adult education efforts, neither usage allowing programs to reach directly their main target audience — the mass of poor rural farmers. (5) Teachers turned out to be disappointingly ineffective discussion-leaders (animators). (6) Most of the key positions in the department are still occupied by French advisors, with the training of Ivorians at higher administration levels having proven unsatisfactory. The authors also mention that, although TPT is now a well-known program, it is accepted more as entertainment than as an intrinsically valuable means of educating the populace. Finally, an attempt is made to place the out-of-school program within the context of recently enunciated national planning strategies. Various appendices and a 37-item bibliography of French- and English-language references (1967–77) are also included.

AID/afr-C-1158 698038300

101 PN-AAG-838

A COST ANALYSIS ON INSTRUCTIONAL TELEVISION IN THE IVORY COAST

Klees, S.J.; Jamison, D.T.
1976, 70 p.

In an effort to improve the quality and relevance of primary schooling, the Ivory Coast has initiated extensive educational reform involving heavy reliance on a system of instructional television (ITV) and a substantial effort to improve the training of classroom teachers. This paper provides a detailed cost analysis of the ITV component of the Ivorian educational reform. The Ivorian ITV system began broadcasting to the first grade in 1971, reaching about 21,000 students. Expanding geographically as well as by grade level, the 1976 program will reach about 400,000 students in grades 1-6. Plans for 1980 call for all schools in the nation to utilize the ITV system with a projected enrollment of almost 700,000 students, each viewing a total of about 190 hours of programming annually. Total project expenditures for 1976 will run about $10 million (in 1972 U.S. dollars), increasing to about $15 million by 1991. As a result of substantial foreign aid, the Ivorian Government paid only about one-half of the project costs in 1976, a percentage which will increase rapidly until 1981 when the Ivory Coast is expected to assume complete system financing. In total costs, the Ivorian system is perhaps the most expensive of any reasonably similar effort. Part of this is due to relatively high production costs, but much more important factors are the high costs of reception system power (given the general lack of electrification, about 85% of the classroom TV receivers operate on expensive battery power) and maintenance. On a unit cost basis, however, the Ivorian ITV system costs fall to a reasonable level in comparison with other ITV projects. Both cost figures are about 70% higher than estimates obtained by a UNESCO technician at the start of the project. The authors conclude that, while the system is rather expensive, significant economies of scale can be achieved if the system expands as planned. Presently, no sound basis for evaluating the pedagogical, social, or economic worth of the investment in Ivorian educational reform exists. A brief section on the marginal costs of system expansion and a 19-item list of French and English language references (1969–76) are included.

AID/afr-C-1158 698038300

102 PN-AAG-839

ETV PROGRAM PRODUCTION IN THE IVORY COAST

Evans, S.; Klees, S.J.
1976, 82 p.

In 1971, the Ivory Coast implemented a nationwide educational system reform designed to improve the reach and quality of educational offerings. A primary component of this reform is the intensive utilization of educational television (ETV) in primary schools. This report evaluates the Ivory Coast's system of ETV program production. Plans for broadcast and production output from the ETV Complex in Bouake have been consistently more ambitious than achievements. Comparing planning documents to actual results indicates that the system is presently operating at only 60%

efficiency. The long run average production costs are estimated under three different assumptions, one representing the present situation and the others positing efficiency improvements. In any case, the Ivorian project seems relatively expensive when compared with other projects, although the large actual and projected student enrollments reduce the per student costs to reasonable levels. The different stages in the process of program production and the interactions between the three principal actors in the process — the producer, the printed support materials writer, and the director — are described in detail. This forms an essential background to the consideration of four key program production issues. The system lacks sufficient organization and planning to ensure that even the most straightforward necessities of program production are accomplished. There has been inadequate training of Ivorians to take over the management and operation of the ETV Complex, planned for 1980. Efforts to set up a feedback and evaluation system have been impeded by the heavy demands of the production schedule. The fourth issue, film versus videotape, is nonproblematic, but is included for the benefit of other LDCs. The authors conclude that the basic ingredients for a good ETV program production system are in place, and now that the initial coverage of the full six grades of primary school is almost complete, more time should be devoted to making improvements in the efficiency with which the system operates before the system is further expanded. A 20-item bibliography of French- and English-language references (1967–76) is included.

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103 **PN-AAG-840**

POST-PRIMARY OPTIONS IN THE IVORY COAST

Daniere, A.; Orivel, F.
1977, 164 p.

The post-primary education (PPE) system in the Ivory Coast faces a considerable challenge: the country already has one of the world's highest expenditures on education as a percentage of GNP, and enrollment will increase by some 300-500% by 1990. This study is intended to assist Ivorian authorities in the planning of PPE over the next decade. It is divided into two parts, the first projecting social outcomes of alternative scopes and contents of PPE, and the second considering alternative options in the technology of PPE. Part one begins with an analysis of the impact of alternative patterns of secondary student flow on social outcomes of interest. Curriculum options in complementary education (intended for all eligible students not enrolled in secondary schools) are then examined. Following this, the scheduling of access to PPE, including the control of repetitions, is discussed. Finally, some problems concerning the transition of pupils educated in TV primary schools to secondary schools are treated. Part two introduces the technological options available in the provision of secondary and complementary education, with concentration on traditional and media technologies of institutional, community, and extension education. Based on the three different classes of options discussed above (those specifying alternative PPE channels, those affecting the student flow through PPE, and those affecting the efficiency and cost of providing PPE), a restricted set of policy options is identified, each made up of vectors of one compatible option from each of the three classes. The final chapter projects public expenditures for these various PPE policies. The study concludes that the resource mobilization required to meet PPE enrollment objectives will strain Ivorian capabilities, irrespective of its financial implications, and urges the choice of policy to be limited to the less expensive options. Other recommendations include that parallel entries into the first cycle of secondary education be reduced or rationalized, that equivalent admission rules be imposed on pupils of traditional and TV primary systems, and that substantial repetitions be allowed in preparing for the PPE entrance examination.

AID/afr-C-1158 698038300

104 **PN-AAH-021**

LEARNING RESOURCE CENTER ECONOMIC ANALYSIS: A TRAINING MODULE

Blair, P.; Swett, F.
San Jose State University.
1978, 93 p.

LDC educational planners are currently examining the economic feasibility of developing and/or utilizing learning resource centers (LRCs) for community-based education programs. This manual shows how and when to apply four common methods of economic analysis (benefit/cost comparison, cost-effectiveness, cost-efficiency, and cost-utility estimation) for this purpose. It is prepared in workbook format, with illustrative examples and exercises to demonstrate the use of these analytical techniques in situations commonly faced in the field. The manual is specifically designed to enable the user to: (1) select the appropriate analytical tool; (2) obtain the needed data; (3) carry out the calculations; (4) utilize the results and implications to make recommendations to LRC decisionmakers; (5) convey the study's limitations; and (6) indicate the scope for improvement through implementing the recommendations resulting from the analysis. First, LRC project costs (inputs) and benefits (outputs) are distinguished and identified. The importance of subjective perceptions is noted and a distinction is drawn between monetary (dollar) and non-monetary (psychic) costs and benefits. A sample LRC cost/benefit balance sheet is provided and is discussed in relation to such a center's scale of operation. There follows a discussion on selecting the appropriate analytical approach based on the nature of the expected benefits. The differences between the four methods is briefly stated and these are reinforced with several short exercises. This information is expanded upon in a subsequent section, where specific economic analyses of LRCs are presented utilizing each of the four methods, where appropriate. In each case, the text is liberally supplemented with exercises to encourage active reader participation. The manual concludes with a brief epilogue concerning the economic analysis "uncertainty principle", pointing out that only two of the three factors of time, money, and accomplishment can be accurately specified in advance of the completion of any project. A 6-item glossary of vocabulary is appended.

AID/la-G-1169 598057300
Also available in Spanish: PN-AAH-022, 97 p.

105 PN-AAH-026

RESOURCE INVENTORY FOR LEARNING RESOURCE CENTER-BASED COMMUNITY EDUCATION SYSTEMS: SIMPLIFIED INDEX ADAPTED FOR JUNE 1979

Ofiesh Associates, Inc.
1979, 188 p.

In 1976, A.I.D. initiated a project to implement a model learning resource center (LRC) for use in community based education systems (BCES) in Latin America. The resource inventory provided in the present document is designed to serve as a model of a materials filing and retrieval system for use by LRC-BCES administrators in locating and obtaining teaching/learning materials for community education programs in rural Latin American locations. Approximately 800 entries offer brief descriptions of books, workbooks, textbooks, guides, films, cassettes, and records. Based upon the needs assessment and feedback from potential users, this list of written and audiovisual materials covers 74 subject areas pertaining to health, home and personal care, agriculture and forestry, crop production and marketing, animal husbandry, organization and management, construction, education, and technical trades. The materials, dating from 1952 to 1977, are either in English or Spanish, and some are in both languages. All entries were carefully evaluated. Materials finally accepted were judged on the basis of six criteria: (1) subject matter; (2) suitability to the knowledge level of the target audience; (3) language; (4) reasonability of cost; (5) availability; and (6) uniqueness (not a duplicate of other materials). The names and mailing addresses of 376 distributors in the U.S., Latin America, and Spain are listed.

AID/la-G-1169 598057300
Also available in English and Spanish: PN-AAH-025, 307 p.; Spanish: PN-AAH-027, 143 p.

106 PN-AAH-142

TRAINING INSTITUTIONS OFFERING COMMUNICATIONS COURSES TO DEVELOPING COUNTRY PERSONNEL

Moulton, J.; Spain, P.
Stanford University, Institute for Communication Research.
1978, 350 p.

In anticipation of an increasing demand for training in development communications and educational technology for personnel from developing countries, A.I.D. commissioned an overview of U.S. and European institutions offering graduate training in these areas. This document presents this overview in two volumes. Information provided in these volumes goes beyond that generally available in university catalogues. Course orientations and faculty backgrounds particularly germane to developing country needs are highlighted, although no judgement is made regarding the quality of course offerings. Emphasis is placed on training in broadcasting and in social science approaches to communication and development. Journalism training or training in the engineering aspects of communications are excluded. Volume one is an annotated listing of 70 institutions that either presently offer, or have the potential to offer, communication for development training. Institutions are listed in three categories, namely, U.S. universities, U.S. non-academic institutions, and Canadian and Western European organizations. Each institution is described briefly in terms of programs relevant to this survey, faculty and student activities, and interest expressed in further cooperation with A.I.D. Volume two provides detailed descriptions of 15 of the U.S. universities listed in volume one. The history, staff experience, and student body composition are discussed for the following universities: Cornell, Florida State, Texas, Wisconsin, Michigan State, San Francisco State, Stanford, Syracuse, Indiana, Chicago, Hawaii, Massachusetts, Pittsburgh, Southern California; and the East-West Communications Institute in Hawaii. These universities provide graduate training in development communications, with emphasis on such areas as research and policy planning, electronic media, and instructional technology. Both volumes are part of an A.I.D. series of studies on the use of education technology and communications for development.

AID/ta-C-1472

107 PN-AAH-186

BASIC EDUCATION IN EGYPT: REPORT OF THE JOINT EGYPTIAN-AMERICAN SURVEY TEAM

Human Resources Management, Inc.; Joint Egyptian-American Survey Team.
1979, 273 p.

A joint Egyptian-American team conducted a 3-month survey to identify the strengths and weaknesses of Egypt's educational system. This document, the result of that survey, describes the history, infrastructure, administration, and finance of Egypt's educational system in 11 technical reports. The inherent social, economic, and geographical differences among Egyptian families are discussed. These socio-economic disparities are prevalent in all levels of Egypt's formal educational system. The low enrollment and high dropout rate in Egyptian schools, and the illiteracy among a major proportion of Egypt's population are also discussed. Supplementary school services have not been able to rectify this problem, as indicated by reports on special education, nutrition, and health services. Improvements in these areas would further tax the physical and financial resources of the educational system. Several reports indicate severe shortages in textbooks, equipment, buildings and trained teachers. The establishment and operation of Egypt's schools is the responsibility of the Ministry of Education (MOE). A report on the organization and functions of MOE reveals deficiencies in the Ministry's educational planning, policy formation and research capabilities. A final technical report discusses Egypt's budgetary process, with particular attention given to educational finance. Allocation, structural, and technical constraints within the educational budget are examined. Strategies designed to address problem areas are suggested and programs requiring external sources and expertise are listed. School enrollment and curriculum statistics, planned activities of the National Council for Education Research, and a list of survey team members are included. The authors recommend that when evaluating budgetary and program decisions a cost-benefit and/or an internal rate of return approach should be used, but only after existing data and data handling systems are improved. In the short term, MOE should set up a performance budgeting system to measure the effectiveness of ongoing programs. Over the long-term, a nationwide school finance plan, using a scientific equalization formula, would equalize educational opportunities throughout Egypt.

AID/afr-C-1198 263000500

108 **PN-AAH-368**

THE BRAZIL CHEMISTRY PROGRAM: AN INTERNATIONAL EXPERIMENT IN SCIENCE EDUCATION

National Academy of Sciences, National Research Council, Board on Science and Technology for International Development.
1979, 27 p.

The National Research Council of Brazil and the U.S. National Academy of Sciences (USNAS) carried out a 7-year experimental program in postgraduate research and teaching in chemistry. The objectives of the program were to develop a Brazilian research capability in certain key fields of chemistry and to stimulate long-term cooperative research collaboration in chemistry between Brazilian and American scientists. In this document, the USNAS assesses the program, which proved truly cooperative both in spirit and in fact. Professors and institutions and joint projects were established in various fields at the University of Rio de Janiero and at the University of Sao Paulo. The objectives of the program were met, but with qualifications. Many graduate degrees (76 in all), both on the Masters and Ph.D. levels, were awarded as a result of this project. Brazilian research capability was developed in most of the target fields of chemistry and most of the projects have continued since the formal end of the program. New methods of teaching, learning, and addressing scientific problems were developed and a valuable international dimension was acquired. The program also served a valuable purpose in stimulating greater exchange and cooperation among faculty members of the host chemistry departments. Although large numbers were not involved, the program mechanism enabled a group of young American chemists to become involved in Brazil's scientific work. Some problems did exist, however. The project terminated abruptly, causing disruptions in ongoing projects. A gradual phaseout might have been preferable. In addition, Brazilian support for research and teaching in chemistry has dwindled in the last few years and this has caused difficulty in supporting ongoing exchange between scientists. Lessons learned from this experiment include the following: (1) strong educational institutions should be the focal points for graduate teaching and research; (2) host country commitment needs to be strong and long-range; and (3) programs should be linked to national development needs.

AID/ta-C-1433 931122300

A student practices the techniques of chemical research.

EDUCATION

109 **PN-AAH-604**

THE COMPARATIVE FUNCTIONALITY OF FORMAL AND NON-FORMAL EDUCATION FOR WOMEN: FINAL REPORT

Derryck, V.L.
1979, 194 p.

With limited resources and competing priorities, development and education planners are debating which educational mode (formal or nonformal) will assure the greatest benefits to women in LDCs in terms of increased incomes, greater control over their lives, and more influence in community and familial decisionmaking. The nonformal system offers short-term, flexible, and inexpensive training in basic literacy, numeracy, and job skills, but it is plagued by lack of status and specific linkages to available employment opportunities. Though formal education has years of tradition and prestige behind it, it is costly, diminishing in quality, and inaccessible to the vast majority of the rural poor. This final report presents the findings of a study to determine which educational mode is more functional for accelerating the integration of LDC women into development efforts. First, the study's parameters, terms, and definitions are briefly described. Next, a historical view of American and colonial African education is provided to determine its relevance to the developing world. The education models indicated that female education benefits national development. Literate women contribute to development by participating in the labor force, molding attitudinal development in children, and by being members of an informed electorate. An overview of the current status of women in formal and nonformal education reveals that women face discrimination in education in terms of access, enrollments, and career guidance. A renewed emphasis on female literacy is advocated. Political constraints to equal economic opportunity in female education are identified and the prospects for change within the near future appear to be small. The major suggested recommendation is the strong encouragement of formal education for females aged 6-14 and nonformal skills training for those over age 14. Conclusions are drawn that women should be educated because: (1) an illiterate population hampers development; (2) it is costly and counterproductive not to educate them; (3) increased education causes decreased fertility; and (4) it is politically advisable. Footnotes and an 88-item bibliography (1957–78) are appended.

AID/otr-147-78-14

110 **PN-AAG-986**

HEALTH CARE TRAINING MANUAL FOR THE VILLAGE HEALTH PROMOTER: INSTRUCTOR'S MANUAL

Project Concern International.
1978, 238 p.

Trainee's manual: PN-AAG-987, 342 p.

Rural health aide programs are one of the most cost-efficient means utilized by LDC governments to improve the health conditions in the rural areas of their country. This manual was developed to assist instructors in training volunteer village health promoters. It begins with a few general tips for the instructor and then presents 36 short training units on how to treat the most common illnesses and methods for preventing many of them. Each unit is structured similarly, with a statement of its objectives, suggested activities, review questions concerning a preceding lesson, sources for further information concerning the topic at hand, and specific suggestions for the instructor. Some sections also contain short plays, audio-tutorials, and filmstrips to reinforce the message presented. The instructor's manual is divided into two parts, the first outlining the 26-unit basic training course for village health promoters, and the second presenting 10 suggested units for additional training. The basic course contains units on: what causes sickness; keeping clean; sanitation; teaching the village about health; food; introduction to health problems; diarrhea; fever; colds; cough; ear problems; malaria; conjunctivitis; impetigo; ringworm; abscesses and boils; open sores and wounds; burns; toothache; constipation; worms; scabies; venereal disease; conclusion to health problems; and clinics for children under 5 years of age. The additional training units cover: fractures and shock; injections and immunization; tuberculosis; measels; whooping cough; family planning; leprosy; hepatitis; tetanus; and rabies. Four appendices contain lists of: (1) teaching suggestions; (2) audiovisual aids (and distributors); (3) newsletters which regularly contain useful information on low-cost teaching aids and articles on new developments in education, health, sanitation, agriculture, etc.; and (4) a list of resource books written in English, Spanish, or French.

AID/pha-G-1101 932007000

111 **PN-AAH-262**

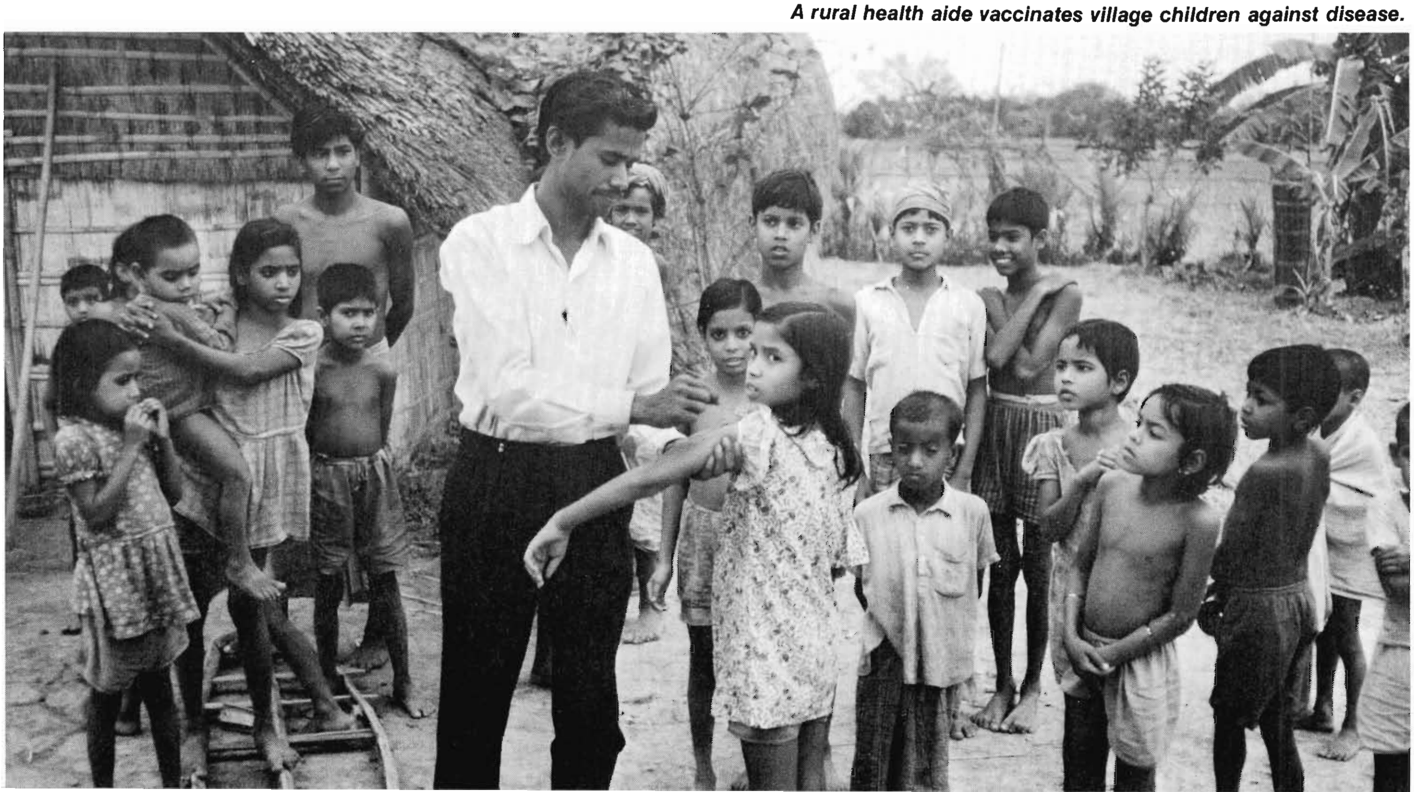
CONDUCTING A RURAL HEALTH SURVEY: EXPERIENCE FROM THE VILLAGE HEALTH SURVEY, DANFA PROJECT, GHANA

Belcher, D.W.; Wurapa, F.K.; Nicholas, D.D.; Kpedekpo, G.M.K.; Ofosu-Amaah, S.; Derban, L.K.A.; Asante, R.O.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1975, 81 p.

Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Monograph Series No. 9

Health surveys of rural populations are valuable in determining health needs, planning useful health programs, and supplementing misleading health statistics. The literature on methods used to plan such surveys, however, is scarce. In an effort to remedy this situation, this report outlines the steps used to plan and pretest a longitudinal health survey conducted as part of the Danfa Comprehensive Rural Health and Family Planning Project in Ghana. The survey was conducted, in three cycles at two year intervals, in 20 randomly selected villages. Major steps in planning the health survey were setting objectives, organizing the survey, and preparing background materials. Extensive pretests were carried out in order to test survey methodology, become acquainted with the study population, and provide team training under field condi-

A rural health aide vaccinates village children against disease.



tions. In addition, a staged series of communications were aimed at community members and officials in order to obtain a high response rate to the survey. These initial efforts were successful: 97.5% of the sample population participated in the survey. The survey clinic operated in four areas: (1) logistics, including ordering of supplies and record forms, and providing for transportation; (2) arrangement of clinic stations in conjunction with community leaders; (3) registration and medical examination of study subjects; and (4) collection of the completed examination forms and termination of the clinics. Concluding that the health survey outlined in the present report is replicable in other developing countries, the survey team makes a series of recommendations on how to adapt the survey to meet regional and national health information needs. A list of 25 references on health, nutrition, and population in Africa is appended, as well as the 1975 Village Health Survey interviewer instructions, and examination procedures and forms.

AID/CM/afr-IDA-73-14 641005500

112 PN-AAH-270

EXPERIENCE IN SELECTING, TRAINING, AND SUPERVISING INTERVIEWERS IN A RURAL HEALTH PROJECT: DANFA PROJECT, GHANA

Belcher, D.W.; Wurapa, F.K.; Lourie, I.M.; Kwabia, K.; Avle, S.K.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1976, 30 p.

Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Monograph Series No. 11

Several monograph papers have been written to inform concerned U.S. and African agencies of experience gained from the Danfa Comprehensive Rural Health and Family Planning Project, a project designed to demonstrate and test new low-cost health delivery systems in Ghana. This paper describes the recruiting and training of five classes of interviewers over a 20-month period (1970–71), when baseline studies were conducted for the project. The initial training provided to eight Ghana national census staff members did not carefully develop their interviewing skills, nor did recruiting procedures adequately determine the interviewer's language proficiency or competence. Project managers diagnosed these problems and revised the training program accordingly. It was found that language proficiency was not tested; that the course consisted of classroom instruction with minimal field practice under close supervision; that the interviewer's performance levels, attitudes toward work, and acceptable behavior toward the village, were not examined; and that the project staff failed to evaluate the incoming enumeration data on a daily basis. Remedies for the training program are discussed in terms of improved recruiting and selection practices of interviewer trainees, (job qualifications, work benefits offered, and screening), subsequent revision of the training course, in-service training, and evaluation of training courses. Discussions of these remedies more fully detail the following recommendations of the authors: (1) Course supervisors should be exposed to field conditions and should conduct household interviews in the same communities where trainees will be working. (2) Trainees should be held in a probationary status until their work is acceptable. (3) By increasing the amount of course time spent in the field, clearly defined instructional objectives for interviewing can be developed and feedback provided to the trainee of his progress toward becoming a skilled interviewer. Ten references (1960–73) are cited at the conclusion of the report. Also included are sample forms for student evaluation of lectures, supervisor evaluation of trainee performance, and the individual field interviewer's evaluation record.

AID/CM/afr-IDA-73-14 641005500

113 PN-AAH-595

PLANNING PHARMACEUTICALS FOR PRIMARY HEALTH CARE: THE SUPPLY AND UTILIZATION OF DRUGS IN THE THIRD WORLD

Gish, O.; Feller, L.L.
American Public Health Association (APHA).
1979, 147 p.

In APHA International Health Programs Monograph Series, No. 2

The importance of the supply and use of pharmaceuticals for primary health care in LDCs has been relatively neglected in the general health literature. This monograph lessens this deficiency by analyzing supply conditions, procurement planning, and drug utilization systems in the Third World. Many LDCs have little or no nationally-based drug industry and thus little control over drug production and prices. Production has largely fallen into the hands of a few transnational pharmaceutical companies who often are unwilling to set up production in LDCs, thus contributing to a lack of indigenous drug production. Because drugs must then be imported, they become prohibitively expensive. To alleviate this situation, countries should procure information on the extent to which leading firms are cornering the market; pass legislation to control advertising and abusive practices; and promote national drug self-sufficiency, quality control, local packaging of drugs, and, most important of all, close cooperation between industrial and health planners. National procurement planning is usually unavailable. The first step in establishing such planning should be the creation of a formulary of quality, safe, and cost-effective drugs reflecting national therapeutic needs. Centralized, bulk procurement is suggested, as is the use of the World Health Organization's International Nonproprietary Names. Dispensing of drugs in LDCs is also a problem due to the lack of graduate pharmacists and misinformation of health workers regarding the correct use and cost of formulary drugs and the hazards they present to patients. Drug use systems must therefore be developed through education of physicians, pharmacy and health workers, as well as the general public; establishment of standardized prescribing from limited formularies and of national drug classification systems and central delivery units; and increases in the number of pharmacy workers (as distinct from graduate pharmacists). This report contains annexes concerning abuses in the patient licensing agreements and regulatory practices in selected countries; a list of essential drugs; a glossary of terms and a 14-item bibliography (1970–78).

AID/ta-C-1320 931097100

114 PN-AAH-596

TRAINING AND USE OF AUXILIARY HEALTH WORKERS: LESSONS FROM DEVELOPING COUNTRIES

Storms, D.M.
American Public Health Association (APHA).
1979, 146 p.

In APHA International Health Programs Monograph Series, No. 3

As the use of auxiliary health workers (AHW) in expanding basic health services to LDC communities grows, data on effective program elements for particular settings need to be shared. This monograph, jointly developed by the American Public Health Association and A.I.D.'s Office of Health, draws upon contributions from knowledgeable AHWs in various LDCs and is designed for use by health planners as a practical sourcebook on ways to design, manage, and evaluate auxiliary based health services, and to plan, implement, and evaluate programs to recruit and train AHWs. An introduction describes generic issues in the design and management of auxiliary-based health services with emphasis on village-level programs and community participation. The next two chapters concern health program design and support systems development, and describe alternative strategies for assisting countries to develop their own resources for improved health care delivery. To function effectively, auxiliaries need a support system which includes government, community, and private sector commitment and resources. Once a funding basis and an approved budget exist, program planning should begin with an assessment of the health needs, resources, and resource requirements. Next, an administrative framework and program specifications such as services, job analysis, and compensation should be developed; and resource requirements, legal sanctions, and an implementation schedule should be established. The fourth chapter describes the recruitment, final selection, and training of AHWs, emphasizing recruitment and selection criteria and methods, and training curricula and methods. The fifth chapter concerns program implementation, including deployment of the AHWs, community mobilization, program management, and the supervision and continuing education of auxiliaries. Finally, program evaluation and the evaluation of AHWs are described. A 313-item bibliography (1934–79), divided according to the sections of the monograph, is appended.

AID/ta-C-1320 931097100

115 PN-AAH-203

METHODS OF MALARIA VECTOR CONTROL: A STATE OF THE ART LITERATURE REVIEW

Davis, R.; Blevins, G.
United States Department of Health, Education, and Welfare, Office of International Health.
1979, 145 p.

During the period May to October 1978, the Office of International Health of the U.S. Department of Health, Education, and Welfare was involved in the preparation of a draft study entitled "Malaria Vector Control: A Review". The study was undertaken in response to the appearance of resistance to DDT and other insecticides among anopheline mosquitoes, the carriers of malaria. The present document, a state-of-the-art literature review, represents the final revised version of the October 1978 study, and attempts to summarize new and old information on all forms of malaria vector control. It includes both those forms presently in use or under development, and those which were largely displaced with the postwar advent of DDT house spraying. After an introduction describing the study's objectives and scope (restricted to technological control methods), the report begins with a concise summary of what is known about residual house spraying with the insecticides currently in use or under trial. A detailed description of the non-spraying measures in past and present use, as well as those currently under development follows. Each technology is reviewed from the standpoint of efficacy, feasibility under field conditions, environmental acceptability, and costs. An effort is made to outline the requirements for planning, organizing, and evaluating vector control campaigns. Finally, a list of possible research topics in vector control methods is included for the benefit of prospective researchers and sources of research funds. These are grouped into five general categories: (1) past and current measures against adult mosquitoes; (2) past and current antilarval measures; (3) past and current combined measures; (4) biological control methods currently under development; and (5) planning, organization, and evaluation. Included in the report are sections on World Health Organization estimates of vector control costs and on the acute toxicity of pesticides used in malaria control. A bibliography of some 450 references (1938–79) is appended.

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116 PN-AAH-531

TSETSE AND TRYPANOSOMIASIS CONTROL: A STRATEGY FOR THE FUTURE IN AFRICA

Interafrican Bureau for Animal Resources
1979, 60 p.

Twenty-two species of tsetse fly and at least six species of trypanosomes are known to transmit sleeping sickness to man and trypanosomiasis to livestock, especially on the African continent. Out of desire to control tsetse vectors in furtherance of African development, a task force of experts from African and international donor agencies and institutions was organized to provide counsel to A.I.D. on appropriate research and action. This report presents their findings and recommendations. The first sections briefly describe the tsetse fly and its habits, including feeding and reproductive behavior, and the mechanism of trypanosome transmission; and trypanosomiasis in animals, its socioeconomic impact, and human sleeping sickness. The task force proposes the development of effective national and regional programs for tsetse and trypanosomiasis control through improved field and research capability to eradicate these insects. To this end, the task force presents 13 recommendations. Studies on the biology, ecology, behavior, and vectoral capacity of tsetse should be intensified. Concerned countries should be supported in preparing programs designed to implement national policy on tsetse and trypanosomiasis control. Projects that are both designed to control or eradicate the diseases and that involve the development of new land areas should be closely integrated with planned land development and current agricultural practices, but with careful consideration of cost-benefit ratios. It is strongly recommended that national multidisciplinary tsetse/trypanosomiasis units be established in each country where trypanosomiasis is endemic. Bilateral agencies should support training and provide basic diagnostic tools to improve present medical surveillance. Research should be continued on selective uses of existing insecticides which do not damage the environment. More effective, less persistent insecticides, as well as other methods of control, should be developed. Academic institutions and others should intensify studies to find more effective and less toxic drugs to treat sleeping sickness and trypanosomiasis. Other recommendations are also included. Twenty references (1970–79) are cited for further reading.

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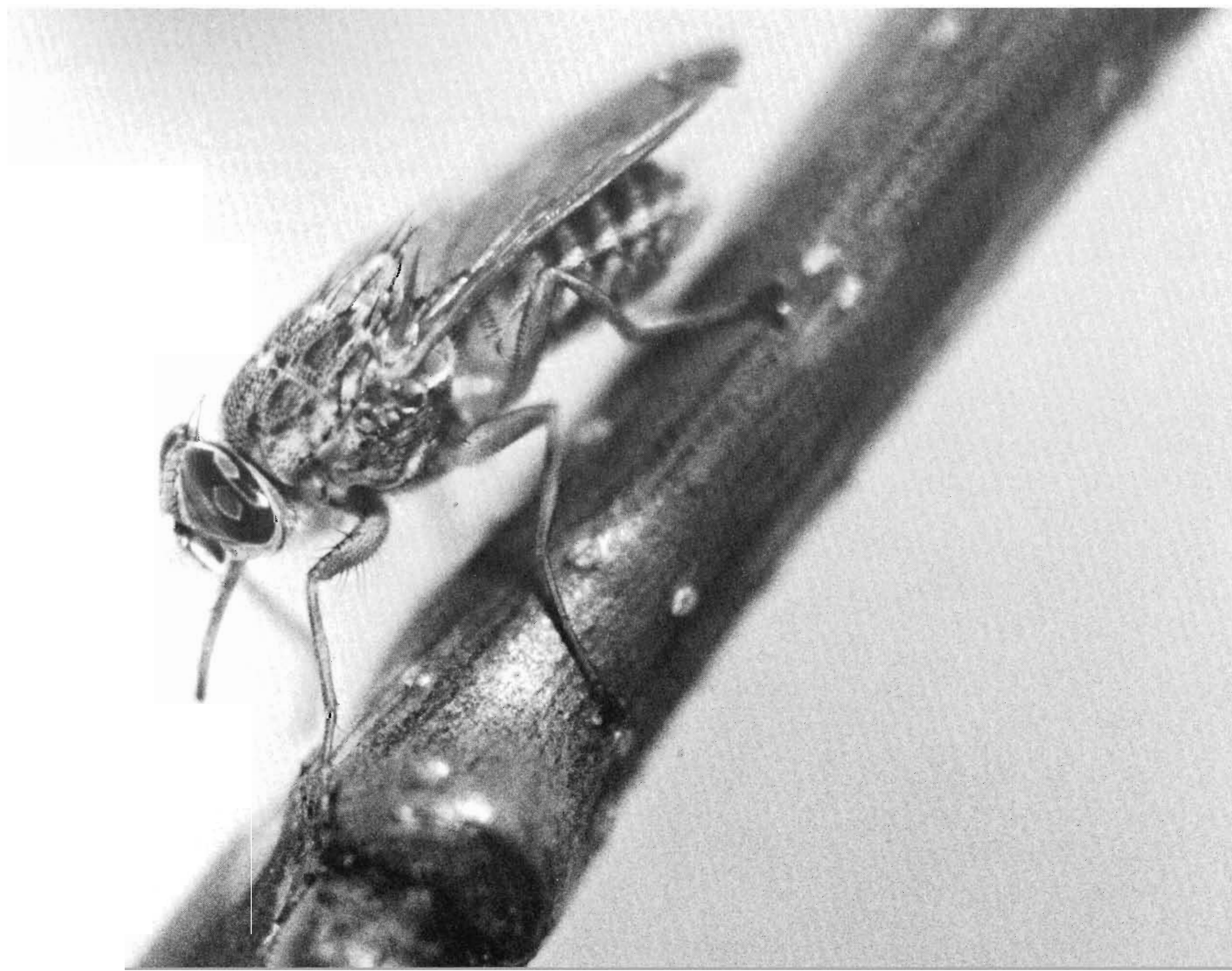
The tsetse fly, carrier of trypanosomiasis (sleeping sickness).



117 PN-AAG-984

WHOLE SOYBEAN FOODS FOR HOME AND VILLAGE USE

Nelson, A.I.; Steinberg, M.P.; Wei, L.S.
University of Illinois at Urbana-Champaign.
1978, 31 p.

Commercial processing of whole soybeans, a high-protein, low-cost food source, must be simplified if soy products are to have wide applicability as a food source for the undernourished of developing countries. This document contains five papers that develop concepts, methods, and processes for home use of the whole soybean for human food consumption. The first paper discusses the home preparation of whole soybeans. To remove the soybean's objectionable flavor and to enhance food value, the lipoxygenase enzyme is inactivated and antinutritional factors are eliminated through the boiling of soybeans in water to which sodium bicarbonate (baking soda) has been added. This cooking process is then applied to a variety of home preparations to produce flavorful and highly nutritional soy products. The next paper describes four methods for home preparation of soy milk, a viable substitute for people who are intolerant or allergic to cow's milk. In each method, raw soybeans are moistened and heated before being ground into a slurry to avoid objectionable flavor. Soy milk prepared from whole beans is considered superior to similar products prepared from cracked beans and full-fat soy flour. A simple recommended procedure for the home preparation of soy milk is described in the paper. The third paper examines the hydration and tenderization of cooked soybeans to which cereals or vegetables are added. This nutritious combination, containing 50% whole soybeans, requires less cooking time and is used to produce convenient breakfast foods and fried patty-meat substitutes. The fourth paper discusses the development of prototype, processed food products derived from whole soybeans such as a canned soybean-chicken product and dried soybean-fruit weanling food for children. The final paper considers the yield, price, and protein content of five Indian dals (pulses). A processing scheme is described to develop soybean dal similar to the indigenous dals at a competitive price. Brief bibliographies (33 in total, 1943–76) follow each paper.

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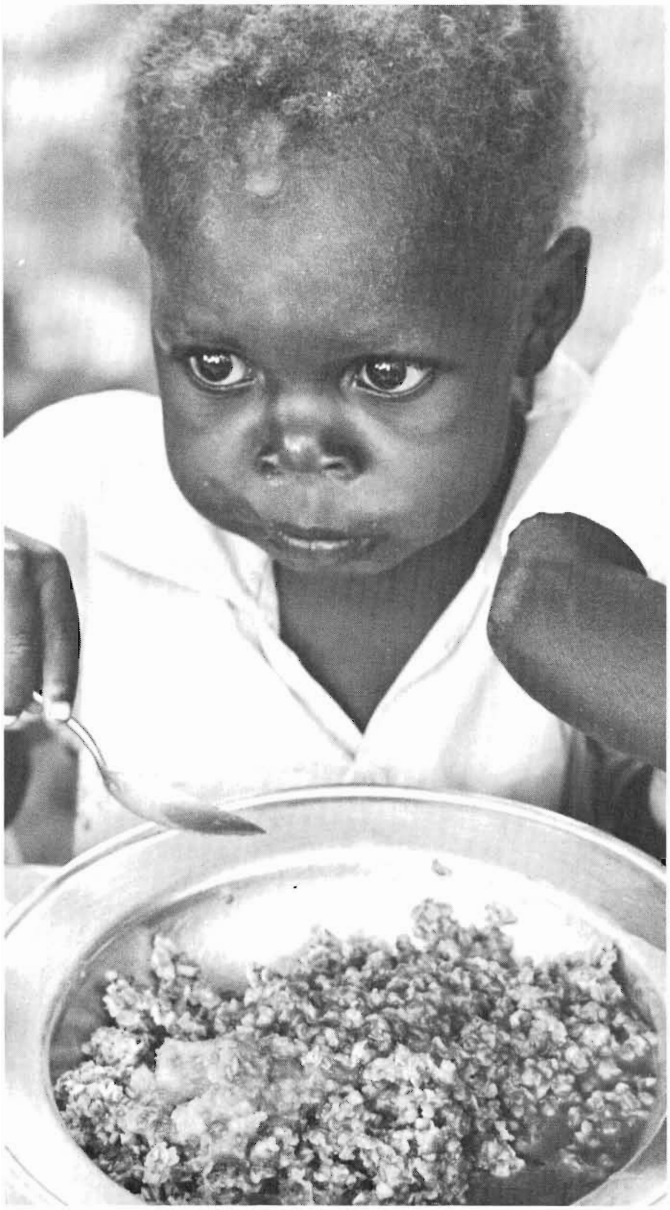

A high-protein corn/soya/milk blend provided under the Food for Peace program supplements this child's diet.

POPULATION

118 PN-AAH-253

INFANT AND CHILD MORTALITY IN THAILAND: LEVELS, TRENDS, AND DIFFERENTIALS AS DERIVED THROUGH INDIRECT ESTIMATION TECHNIQUES

Knodel, J.; Chamratrithirong, A.
East-West Center, East-West Population Institute.
1978, 46 p.

Papers of the East-West Population Institute, No. 57

Using indirect estimation techniques, infant and child mortality trends and differentials can be derived from survey and census data which show the proportion dead among children ever born. These indirect techniques are particularly valuable when registration data are deficient. Although mortality may be understated by these techniques, trends appear to be reasonable and consistent with those independently calculated. This study employs such indirect techniques to examine national, regional, and urban/rural levels and trends as well as socioeconomic differentials in infant and child mortality in Thailand. Infant mortality in Thailand appears to be declining at all levels. Moderate regional mortality differences exist, however. Mortality conditions appear to be worse in the north and northeast than in the south and central regions. Infant mortality is lowest in the central region and highest in the north. These differentials, however, are of questionable validity since the south is culturally more distinct from Thailand's other regions and may have a different level of reporting accuracy. They may also reflect peculiarities of the data rather than an actual trend. Child mortality is substantially lower in the urban sector than in the rural sector. The average life expectancy of a child born in Bangkok is almost 14 years longer than that of a child born in the countryside. This urban advantage is due to higher socioeconomic levels and easier access to superior health services. Substantial socioeconomic differences in infant and child mortality exist. There is a sharp inverse relationship between both the mother's level of educational and occupational attainment and child mortality, and a positive correlation between working mothers and child mortality. There is no significant relationship between religious affiliation and child mortality. It is evident that children of the higher socioeconomic strata enjoy more favored mortality levels than those of lower socioeconomic position. Documentation of such differences should help to guide a national health policy to extend the favorable conditions which reduce mortality to a broader spectrum of the population. A 17-item bibliography (1966–78) is appended.

AID/pha-G-1058

119 PN-AAH-255

DEMOGRAPHIC RESEARCH IN JAPAN, 1955-70: A SURVEY AND SELECTED BIBLIOGRAPHY

Matsumoto, Y.S.
Hawaii University School of Public Health.
1974, 81 p.

Papers of the East-West Population Institute, No. 30

During the decade following World War II, demographic research in Japan focused on the problem of excess population. During the postwar period, Japan experienced the inevitable baby boom, at the same time the nation's death rate was rapidly declining as a result of public health programs. The difference between increased fertility and reduced mortality resulted in the highest population growth rates, from natural increase, in Japan's history. By 1955, the necessity of restricting population growth had become obvious to the Japanese. Having experienced this postwar baby boom in the midst of a depressed economic situation, couples were strongly motivated to limit their families in order to realize their aspirations for a better life. Thus, it was people, not the government, who first took steps to restrict family size. This document consists of an overview of indigenous demographic research in Japan during the period 1955–70, followed by a selected bibliography of works by Japanese authors. Topics covered in the overview section include a discussion of research institutions, recent trends in demographic research, demographic studies, fertility, mortality, population and the economy, and the past and future in terms of demographics. The author notes that population growth in Japan is essentially under control, with an annual rate of natural increase stabilized at about 1.1% per year. With an increasingly educated, affluent, and urbanized population, Japan ranks among the world's most highly industrialized nations. Japan's demographic concerns now relate to regional imbalances, manpower deficiencies, and social welfare. For this reason, the focus of demographic research is shifting from the national population as a whole to specific segments of the population. The bibliographic section of the report is preceded by a subject index and includes 373 entries.

AID/csd-3310 931095200

120 PN-AAH-268

SOME RESULTS AND PROBLEMS ON THE ESTIMATION OF VITAL RATES IN A RURAL AFRICAN SETTING VIA MULTIPLE METHODS

Kpedekpo, G.M.K.; Wurapa, F.K.; Lourie, I.M.; Neumann, A.K.; Belcher, D.W.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1975, 33 p.

Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Monograph Series, No. 4

Effective management of a public health program requires the compilation of detailed demographic information on age, sex, mortality, cause of death, etc. This paper is one of a series concerning vital events registration and baseline demographic surveys conducted for the Danfa Rural Health and Family Planning Project in Ghana. Specifically, it presents the results of a recent experiment on the collection and analysis of data on births and deaths using the well-known Chandrasekhar-Deming multi-approach method. The site of the study was located 10–50 miles from Accra, an area with approximately 50,000 rural inhabitants. First, baseline data were gathered on age, sex, family relationship, education, religion, ethnic group, and pregnancy status. Follow-up surveys were carried out at 6-month intervals in order to in-

Congestion in Calcutta.

crease the matching and accuracy of data on births, deaths, and migration. In designing their experiment, project personnel attempted to overcome the major difficulty of accounting for three broad classes of events inherent in any registration or survey. These classes of events include: (1) those that occur in the sample area to usual residents; (2) those that occur to residents when they are away from the area; and (3) those that occur to visitors to the sample area. A number of variables were selected for the matching of vital events: the house number, the name of the child/deceased, the sex of the child/deceased, date of birth/death, place of birth/death (and residential status), name of the mother (for births), and age at death for the deceased. Problems arose due to differences in receiving and recording information on names, and because of the large number of items to be compared and verified. In addition, problems involving memory lapse, mobility of individuals and households, and other factors suggest that some uniform method should be developed so that matching can be done with greater accuracy. In addition, the manual matching operations used in this experiment were time-consuming and delayed publication of results. Data from the registration and surveys are presented in tabular form and are discussed in the text.

AID/CM/afr-IDA-73-14 641005500

121 PN-AAH-323

ON THE END OF THE POPULATION EXPLOSION

Demeny, P.
Population Council.
1979, 38 p.

In Center for Policy Studies Working Paper No. 39

Today any interested customer can choose among an impressive variety of population forecasts. One such forecast by Donald J. Bogue and Amy Ong Tsui foresees zero world population growth by the year 2000. This paper examines that prediction. Bogue and Tsui, respectively, are Director and Assistant Director of the Community and Family Study Center, a well-known research and training organization at the University of Chicago. Their forecast merits special attention because it exemplifies some problems in methods and interpretations prevalent in contemporary population literature. According to the author, Tsui and Bogue's assessment of recent fertility declines must be viewed with skepticism. That birth rates have been declining in countries comprising the majority of the world's population is a fact established beyond reasonable doubt. However, it is doubtful that the declines postulated for key developing countries (China, Indonesia, and Egypt) were as large, or even nearly as large, as the two authors claim. The same applies to the contention that key South Asian countries (India, Pakistan, and Bangladesh) may have entered a stage of accelerating fertility decline, or that the majority of African countries have experienced appreciable fertility decreases. Caution is also warranted regarding Tsui and Bogue's estimates of future fertility trends. Their central thesis focuses on family planning as the prime explanation of both already observed (1968–75) and future fertility declines. The main prop for that thesis was multiple regression analysis. However, the validity of a causal interpretation of numerical findings in a regression analysis is dependent on the validity of the relationship of the variables in question. Tsui and Bogue assumed the validity of the relationship posited in their model, and proceeded directly to computing the regressions and interpreting results. This is acceptable practice only if the computation in question rests on well established theory, or if the direction of the causal relationships are sufficiently evident without further argument. Report includes footnotes and a listing of all papers issued by the Center for Policy Studies in 1977 and 1978.

AID/pha-C-1199 932063200

122 PN-AAH-250

A COMPILATION OF AGE-SPECIFIC FERTILITY RATES FOR DEVELOPING COUNTRIES

United States Department of Commerce, Bureau of the Census.
1979, 158 p.

In International Research Document No. 7

To interpret fertility levels and patterns for a given country, it is useful to examine a consistent set of fertility data. This publication presents a compilation of age-specific and total fertility rates for 126 LDCs of Africa, Asia, Latin America, and Oceania. Rates are shown either directly, as derived from vital registration systems, surveys, or censuses, or as adjusted by various techniques, particularly the Brass fertility technique. The data are compiled as part of an ongoing program of the International Demographic Data Center (IDDC), Population Division, U.S. Bureau of the Census (BOC), to maintain a comprehensive data base containing demographic information on LDCs. Selected data from this data base, including the rates shown in this report, are regularly provided to A.I.D. and are used by the IDDC staff as a starting point in establishing a consistent set of data for selected countries. The data in this publication are not evaluated and do not represent estimates made nor condoned by the BOC. (For evaluated data, users may refer to the BOC's other publications, *Country Demographic Profiles* and *World Population*.) Data are presented chronologically in tabular form. Corresponding notes are labeled by the year of reference of the data. In cases, however, where particular censuses or surveys have yielded retrospective rates for a series of years in the past (and it is usefull to examine these rates in a block rather than interspersed with rates from other sources) these rates are presented in tabular form by source, rather than in chronological order. In all instances, the type of data collection system (survey, census, vital registration), source of the data, and/or method used in estimating or adjusting the rates are cited in the annotation which follows each table. The data cover the period from 1960 to 1979, although rates for earlier years are often included for countries that lack recent information. In most cases, only national data are presented, but rates are shown for rural or urban areas, particular geographic regions, and ethnic or religious groups in cases where national data are scant or nonexistent.

RS/COM/BUCEN-03-78 932064900

123 PN-AAH-251

SPATIAL FERTILITY ANALYSIS IN A LIMITED DATA SITUATION: THE CASE OF PAKISTAN

Fuller, G.; Khan, M.M.
East-West Center, East-West Population Institute.
1978, 25 p.

Papers of the East-West Population Institute, No. 56

Fertility rates are generally explained by analysts in terms of socioeconomic variables. This paper, published by the East-West Population Institute, analyzes fertility data from Pakistan as a test case to argue the benefits of an aereal or spatial analysis of fertility data to explain linkages left unexplained by socioeconomic analysis. The spatial approach is based on the assumption that linkages between fertility and socioeconomic characteristics vary systematically over space. On the basis of this assumption, inferences can be drawn about these linkages when data are incomplete or limited, as is particularly true in Pakistan. Basically, inferences are drawn, though with less accuracy, in much the same way that topographic maps are created. (In mapmaking, direct measurements of elevation are made at only a few points, with the geographer interpolating between the observation points.) In the present study, district level data from 1951 and 1961 censuses were used to construct fertility trend surfaces in three orders. First-order (planar) surfaces indicated that, in general, fertility is highest in the northwest and lowest in the southeast. While second-order surfaces add little beyond this, third-order surfaces, which are the most accurate of all, reveal lower fertility in the south, east, and northeast, thus modifying (without negating) the northwest-southeast generalization revealed in the lower-order surfaces. Positive residuals (exceptions) from third-order surfaces can have a practical value for program planners faced with strategic choices in regard to fund allocation. For example, it can be inferred from 1951 residuals that high fertility districts probably possess abnormal linkages between socioeconomic variables and that resource allocation in these areas would have a higher probability of success. Similarly, the shape and pattern of 1961 residuals indicates that economic development along the Indus River Valley may be responsible for increased fertility rates, implying a strategic response such as including fertility costs in the costs of development projects. The study concludes with suggestions for improving spatial methodology. A 16-item bibliography (1959–78) is appended.

AID/pha-G-1058

124 PN-AAH-252

REGRESSION ESTIMATES OF CHANGES IN FERTILITY, 1955-60 TO 1965-75, FOR MOST MAJOR NATIONS AND TERRITORIES

Palmore, J.A.
East-West Center, East-West Population Institute.
1978, 64 p.

Papers of the East-West Population Institute, No. 58

Since the registration of births is inadequate worldwide, knowledge of world fertility trends must be based on estimates using alternative data sources. Using data from the 1970 round of censuses, this paper updates and revises regression equations proposed by Bogue and Palmore in 1964 and summarizes fertility changes for most major nations and territories. Using census and vital registration data, regression equations for estimating direct fertility measures (the total fertility rate and age-specific fertility rates) from indirect fertility measures (the child/woman ratio) were calculated. These equations were used subsequently to estimate the direct fertility measures for countries lacking good vital statistics. Employing the above methods, the paper estimates trends in fertility for the LDCs for the periods 1955–60 and 1965–75. Data are presented in the following four tables: (1) regression estimates for major countries and territories of national crude birth rates and total fertility rates for 1955-60, crude birth rates for 1970-75, and average annual percentages of change in fertility rates; (2) number of countries experiencing increased or decreased fertility rates (1955–60 to most recent census year for which data were available); (3) percentage distribution of estimated crude birth rates for 163 countries (most recent census year for which data were available); and (4) regression estimates of national crude birth rates, total fertility rates, and age-specific fertility rates for most recent census year available (major countries and territories). The probable margins of error and other limitations in the regression procedures are also discussed. The results support the contention that most of the countries reduced their fertility between 1955–60 and 1965–75. Despite these declines, however, fertility rates for much of the world remained very high as of the latest census. The fertility transition is, at best, only at the beginning stages for many countries. Illustrative tables, regression equations, and a 20-item bibliography (1949–78) are appended.

AID/pha-G-1058

125 PN-AAH-258

ESTIMATES OF INDICES OF FERTILITY FROM REGISTRATION DATA

Kpedekpo, G.M.K.; Nicholas, D.D.; Ofosu-Ammah, S.; Wurapa, F.K.; Belcher, D.W.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1975, 46 p.

Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Monograph Series No. 3

Despite efforts to improve the registration of vital events in developing countries, it is likely that available demographic data in these nations will be seriously defective for a long time to come. It is therefore necessary to obtain as much profit as possible from existing data. This paper attempts to derive indices of fertility using data obtained from vital events registration and baseline demographic surveys conducted under the Danfa Rural Health project in Ghana. (The project included a longitudinal study of approximately 50,000 rural inhabitants, 10–50 miles from Accra.) The author, following Brass's method, proposes that the most effective way to extend existing registration data is to collect further information on the maternity history of mothers (i.e., the number of children ever born and the number surviving) at the time of registration or notification of birth. Using such baseline data, several indices of observed and estimated fertility are demonstrated. These relate to the average number of children per mother, the average number of children per woman, age-specific fertility rates, total fertility rates, gross reproduction rates, relative age-specific fertility rates, age-specific order birth rates, crude birth rates, general fertility ratios, and child/woman ratios. In addition, age patterns are analyzed in order to classify age-specific fertility rates according to different patterns, and to study the age structure of fertility in the project area. Lotka's analysis of stable population relationships has shown that the higher the intensity of fertility (the mean number of children per woman), the higher the rates of increase; also, the lower the mean age at motherhood, the higher the rate of increase. From this it can be concluded that population policy must aim not only at reducing the average number of children per mother, but also at increasing the mean age of motherhood as well. Report includes a very brief bibliography (nine items, 1939–73) and numerous tables illustrating the various data and findings.

AID/CM/afr-IDA-73-14 641005500

126 PN-AAH-259

AN ANALYSIS OF THE POPULATION SIZE, AGE/SEX DISTRIBUTION

Kpedekpo, G.M.K.; Lourie, I.M.; Wurapa, F.K.; Belcher, D.W.; Neumann, A.K.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1975, 42 p.

Danfa Comprehensive Rural Health and Family Planning Project, Ghana, Monograph Series, No. 6

Several monograph papers have been written to inform concerned U.S. and African agencies of experience gained from the Danfa Comprehensive Rural Health and Family Planning Project, a project designed to demonstrate and test new low-cost health delivery systems in Ghana. As part of the project's research component, this paper analyzes population size and the age/sex distribution of the project's four study areas. In addition to these areas, information was sought on ethnic composition, religion, occupation, literacy, and level of education. The methods used to measure these variables, as well as the difficulties involved in this use, are discussed in each section of the report. The population was enumerated in three ways: de jure (permanent residents, whether present or away), de facto (those actually present), and comprehensive (the combination of the two). Depending on the method of enumeration, the total population of all four areas ranges from 47,655 to 50,127. In individual enumerations, the de jure enumerated population was always less than the de facto enumerated population. The geographic distribution of the population, as well as the distribution by residential status, indicates that population differences result from the estimated number of visitors and absent residents. The age of those under 15 computed by de jure enumeration ranged from 46.2% to 48.3%, while the proportion of the total population aged 65 and above ranged from 4.2% to 6.0%. The percentages under 15 and over 65 are similar by both de facto and comprehensive enumeration. Age/sex pyramids indicate a population with a low median age of 17, a very small proportion of elderly persons, and a combination of high birth and death rates. The median age for females is consistently higher than that of males. Child/woman ratios give evidence of high fertility in some areas, but fertility may be falling in others. As many of those interviewed were illiterate, the accuracy of age reporting and the Myer's procedure used to correct possible distortions are discussed. Tables illustrating these data are provided throughout the report. Four entries (1972–74) are cited for further reference.

AID/CM/afr-IDA-73-14 641005500

127 PN-AAH-260

AN ANALYSIS OF MARITAL STATUS, EDUCATION, ETHNIC, RELIGIOUS, AND OCCUPATIONAL COMPOSITION

Kpedekpo, G.M.K.; Wurapa, F.K.; Belcher, D.W.; Neumann, A.K.; Lourie, I.M.
University of California at Los Angeles, School of Public Health; University of Ghana Medical School.
1975, 40 p.

Danfa Comprehensive Rural Health and Family Planning Project, Monograph Series, No. 7

Several monograph papers have been written to inform concerned U.S. and African agencies of experience gained from the Danfa Comprehensive Rural Health and Family Planning Project, a project designed to demonstrate and test new low-cost health delivery systems in Ghana. As part of the research component of the project, this report describes selected social and economic variables for marriage, education, ethnic, religious, and occupation characteristics of the population in the project's four study areas. These study areas, comprising 50,000 rural inhabitants living 10–50 miles for Accra, are defined by the type of health service administered (comprehensive, health education, family planning, and standard). The pattern of marriage is surprisingly similar in all four areas: age at marriage for both males and females was estimated at 23.7, 23.4, 22.6, and 23.9 years for areas one, two, three, and four and five respectively. There does exist a differential in the male and female ages at marriage, but this differential is essentially the same in all areas. There is considerable differential among the educational and literacy levels from one project area to another, with area one in the favoured position relative to the other three areas. With respect to ethnic composition, all project areas show significant variations in the proportion of the population who are Akwapim, Ewe, or non-Ghanaian. In addition, areas two and three have a large number of residents who follow traditional religious practices. Although the major occupation of persons economically active in all four project areas is farming and other agricultural activities, the proportion employed in farming in each area does not vary greatly. Several graphs and charts are provided to illustrate the data. Four entries (1953, 1968) are cited for further reference.

AID/CM/afr-IDA-73-14 641005500

128 PN-AAH-475

A CHECKLIST FOR EVALUATIVE OVERVIEWS OF FAMILY PLANNING PROGRAM ACTIVITIES

Reynolds, J.
Columbia University, International Institute for Study of Human Reproduction.
1973, 20 p.

In Manuals for Evaluation of Family Planning and Population Programs, No. 6

Program evaluations should be objective, systematic, comprehensive, and useful. That is, they should be objective in the selection of topics; systematic in approach; inclusive of all studies of program activities; and establish a link between evaluation and planning. Family planning program evaluations do not always satisfy these criteria. Current family planning evaluations are frequently limited to clinic service statistics and Knowledge-Attitude-Practice sample surveys. To remedy these lapses, this report outlines the essential components of a comprehensive evaluation of family planning program activities. To be useful, evaluations should include the following: need for family planning services; description of quantity and quality of services; identification of factors that facilitate or impede acceptance of services; analysis of data gaps; listing and bibliography of research and evaluation studies underway or reported; summaries of apparent strengths and weaknesses of program activities; and recommendations for research and future evaluations. An overview of needs, operation, processes, resources, and evaluations, should be provided, as well as a checklist of program planning, operation, and evaluation elements. The report includes a checklist to be submitted when evaluating family planning programs.

AID/csd-2479 GTS

129 PN-AAH-476

THE IMPACT OF FAMILY PLANNING PROGRAMS ON FERTILITY RATES: A CASE STUDY OF FOUR NATIONS

Teachman, J.; Bogue, D.J.; Londono, J.; Hogan, D.
University of Chicago, Community and Family Study Center.
1979, 62 p.

Documentation that family planning programs are capable of inducing major and rapid decline in fertility is still quite scarce. This monograph tests hypotheses linking family planning programs to changes in fertility by assembling data for four specific LDCs. The first chapter sets out a methodology for measuring the impact of family planning programs on birth rates. Two packaged computer programs (PROJTARG and TABRAP) are used for calculating the contraceptive protection (number of new acceptors) that must have been attained in the test area in order to have resulted in the observed fertility rate reduction. The proportion of protection provided by inside-program as compared with outside-program sources is then estimated to the maximum extent possible. With this information, the net proportion of total contraceptive protection provided by the organized family planning program can be determined under differing assumptions about the substitutability of contraceptives (the number of acceptors who would have used other methods if the formal program had not existed). This model is then applied to four countries — Colombia (treated on both a national and a state-by-state level), Thailand, Indonesia, and Korea. These four countries have all sponsored vigorous family planning programs since at least 1970. Each of these family planning programs is shown to have been the major source of contraceptive protection by which observed fertility declines have been achieved. Presentation of the Colombian example includes a detailed discussion of the use of various demographic techniques to obtain consistent estimates of fertility levels and contraceptive usage. In the Indonesian case, the impact of the family planning program is not judged by comparing contraception provided by the program against required contraception, as reliable data needed for the computer programs was not available. A births-averted procedure was used instead. The studies in the Thai and Korean cases also suggest that government support for family planning programs is crucial. Sizable (15-25 items) reference bibliographies are included after each chapter.

AID/pha-C-1108 932061900

130 PN-AAH-605

JOINT IGCC/IFRP EAST AND SOUTH EAST ASIA SEMINAR ON REGIONAL FERTILITY RESEARCH, BANGKOK, THAILAND, 1979

International Fertility Research Program (IFRP).
1979, 219 p.

A joint Inter-Governmental Coordinating Committee (IGCC)/International Fertility Research Program (IFRP) seminar on regional fertility research was held in Bangkok, Thailand, July 18–20, 1979. The seminar was attended by a total of 48 participants and resource persons and 11 observers, representing 10 countries of East and Southeast Asia: Indonesia, Malaysia, Nepal, the Philippines, Singapore, Thailand, Hong Kong, Japan, Korea, and Taiwan. Its objectives were three-fold: (1) to provide a forum for exchange among health/fertility professionals of experiences and research either completed or ongoing in the participating countries; (2) to enhance their awareness of IFRP's activities; and (3) to help define regional needs in contraceptive safety research, introduction and transfer of new technology, and maternity health research. This report of the seminar summarizes its proceedings and group sessions, and contains the text of 29 papers — nine country papers (Thailand excluded) and twenty professional documents. The latter describe primary health care delivery systems; studies of Depo Provera; risks and benefits of contraception; sterilization camps; outreach systems; clinic management; use of traditional birth attendants; effects of steroidal contraceptives (oral pills) on Asians; maternity care monitoring; acceptability of family planning in Malaysia and Indonesia; and incidence and follow-up of trophoblastic diseases (moles). This document is a valuable resource for use by fertility/family planning professionals in Asian countries since it contains detailed research findings, references, and lists of previous surveys and research studies as well as ongoing projects. A roster of seminar participants, observers, support staff, steering committee, and resource persons is appended.

AID/pha-C-1172 932053700

131 PN-AAH-614

OWN-CHILDREN ESTIMATES OF FERTILITY FOR THAILAND BASED ON THE 1970 CENSUS

Retherford, R.D.; Pejaranonda, C.; Cho, L.; Arnold, F.
East-West Center, East-West Population Institute.
1979, 59 p.

In Papers of the East-West Population Institute, No. 63

Accurate estimates of Thailand's birthrate levels and trends are needed to monitor the Thai government's large-scale family planning program and to ensure the efficient operation and optimal allocation of family planning funds among the country's different geographic areas. This paper, employing data from the 1970 census, provides own-children estimates of fertility levels, trends, and differentials for Thailand over the 1960s decade. These estimates appear broadly consistent with other published estimates. Total fertility for the country declined slightly from about 6.5 to 6.2 children per woman between 1960 and 1969. All four regions of the country — North, Northeast, Central, and South — showed total fertility rates between six and seven children per woman for 1960–64. By 1965–69 total fertility rates had fallen by slightly over half a child in the North and Central regions, remained almost unchanged in the South, and increased slightly in the Northeast. Levels and trends differed greatly between rural and urban areas. Rural total fertility declined slightly from about 6.7 in 1960–64 to about 6.5 by 1965–69. Urban total fertility, which was about 1.5 children lower than rural total fertility in 1960–64, fell substantially from 5.0 to 4.0 children by 1965–69. Among rural women, those with no education slightly raised their fertility between 1960 and 1969, while those with primary education slightly reduced their fertility. Rural women with more than a primary education showed a substantial fertility decline, but they were too small a proportion of all rural women to affect overall rural fertility. Among urban women, fertility declined considerably in all educational strata. Age at marriage changed little over the 1960s, so that trends in marital fertility closely paralleled trends in overall fertility. Estimates by occupation showed slight fertility decline among rural farmers and miners, with total fertility close to seven children per woman; and large fertility declines among urban professional, technical, and administrative workers, with total fertility between two and three children per woman. Illustrative tables and a 41-item bibliography (1940–79) are appended.

AID/DSPE-C-0002 932064800

132 **PN-AAH-615**

SOCIOECONOMIC AND CULTURAL ASPECTS OF MARRIAGE AND FERTILITY IN URBAN PAKISTAN

Karim, M.S.
East-West Center, East-West Population Institute.
1979, 32 p.
In Papers of the East-West Population Institute, No. 63

Historically, a well-established inverse relationship between a woman's age at marriage and her fertility has existed worldwide. Female age at marriage has important implications for the study of fertility, because the length of the female reproductive period is largely determined by the age at which a woman marries. Little research has been done on the relationship between age at marriage and fertility in Pakistan. Furthermore, most of the studies concerning this relationship have ignored its social and cultural aspects. Using data from the 1968-69 Pakistan National Impact Survey of 1,114 currently married urban women aged 15-44, this paper relates the fertility of urban Pakistani women to their ages at marriage and identifies influential sociocultural and economic factors. The religious support given to universal and early marriage, segregation of the sexes, taboos against premarital sex, limited contraceptive use, and a large-family norm contribute to the low mean age at marriage and high fertility of Pakistani women. Mean age at marriage reported by this sample was low (16), although among younger women it was higher (17.5). Mean fertility among those aged 35-44 was 6.7 births, but it was 29% lower among women who married at age 19 or later than among those married at age 16 or earlier, even though women who had postponed marriage reproduced faster. Cumulative fertility differentials were found among ethnic groups, socioeconomic groups, and residential groups who married at younger and older ages. Duration of marriage and first pregnancy interval were important predictors of the inverse relationship between age at marriage and cumulative fertility. With duration of marriage controlled, cumulative fertility was 14% lower among late-marrying women than among those who had married early; with first pregnancy interval controlled, cumulative fertility was 32% lower among late-marrying women. Since parents consider daughters as liabilities and, therefore, mate them at an early age, raising the legal female age at marriage from 16 to 19 must be accompanied by basic changes in women's socioeconomic roles if a fertility decline is to take place in Pakistan. A 25-item bibliography (1954–79) is appended.

AID/DSPE-C-0002 932064800

133 PN-AAH-900

A REFERENCE COMPILATION OF SCIENCE AND TECHNOLOGY OFFICIAL DEVELOPMENT ASSISTANCE FURNISHED BY A.I.D. FOR THE LESS DEVELOPED COUNTRIES (LDCs)

Reynolds, A.; Gaithwright, T.
Logical Technical Services Corporation.
1980, 88 p.

Prepared for the United Nations Conference on Science and Technology for Development

This research report, summarizing official development assistance provided by A.I.D. to LDCs, was produced to meet the needs of participants in the United Nations Conference on Science and Technology for Development. It represents a synthesis of A.I.D.'s economic assistance philosophy, which is characterized by a twofold thrust: (1) a "basic human needs" approach to bilateral development assistance, which combines the furthering of U.S. interests abroad with U.S. humanitarian interest in that quarter of the world's population condemned to live at a substandard level; and (2) a refocussing of A.I.D.'s assistance to LDCs from sophisticated technology to light-capital, labor-intensive applications of scientific and technological developments. The report concentrates on development assistance in the fields of health, nutrition, and population; energy and natural resources; employment, trade and industrialization, and access to technology; food, climate, soil, and water; and urbanization, transportation, and communication. In each case, the relevant technologies and means of technology transfer are discussed in conjunction with a statement of the development problem addressed by these technologies and with illustrative examples of A.I.D. programs. The report concludes that comparatively little U.S. technology can be transferred to LDCs without significant adaptation. The LDCs have become aware of the need for technologies tailored to fit their resource endowments and absorptive capacities, and stress is being placed on the development of more appropriate technologies as well as on devising policies and institutions permitting LDCs to make better technological choices. An extensive subject index is included in this report.

AID/DSAN-C-0021 931023200

134 PN-AAH-218

MOROCCO ENERGY STUDY

Jacobs, A.B.; Farber, E.B.; Gordon, M.; Izbickas, V.; Melby, E.D.K.; Westerfield, J.D.
United States Agency for International Development, Development Support Bureau, Office of Energy.
1978, 67 p.

In November 1978, a team of six U.S. energy specialists assisted the Government of Morocco (GOM) in defining energy policies to further economic development and reduce Moroccan dependence on foreign oil. This report presents the team's findings and the conclusions drawn therefrom. Three areas were reviewed: shale oil development, with emphasis on *in situ* retorting; hydroelectric production; and nonconventional energy sources. Oil shale represents Morocco's largest potential indigenous energy source. Its development is essential if imported fuels, which currently cover 80% of the nation's needs, are to be reduced over the long term. Confirmed resources within the Atlas mountains have the potential for delivering up to 22 million barrels of oil annually, the national consumption level in 1976. However, such problems as the ultimate use of the oil, the disposal of ash, provisions for water, and the reduction of sulphur content, have not been addressed. Recommendations focus on the need for a comparative analysis of alternative exploitation methods and for *in situ* field tests. Studies on hydroelectric power conclude that decentralization may be more economical than major project initiatives, such as at Tarfaya, where costs are estimated to be five times greater than the present national average. Systems studies for improved use of existing plants and for devising more economical uses of salt are recommended. In the area of nonconventional energy, the team endorses the GOM's proposed solar center and recommends increased training and planning development to clarify organizational structure and objectives. Along with biomass studies, the establishment of projects in a decentralized pattern is also suggested. To insure that future GOM energy investments do not detract from those in other sectors, energy development on a regional rather than national level is advocated. The report concludes with recommendations for A.I.D. assistance to the GOM in areas of renewable energy sources and shale oil development which would reduce the need for nuclear development. A bibliography of French-language resource materials (1972–78) is appended.

DS/EY

135 PN-AAH-389

THE CONTRIBUTION OF RENEWABLE RESOURCES AND ENERGY CONSERVATION AS ALTERNATIVES TO IMPORTED OIL IN DEVELOPING COUNTRIES

Palmedo, P.F.; Baldwin, P.
Energy/Development International.
1980, 187 p.

LDC's (non-OPEC) now account for 15% of the world oil demand. This demand is expected to grow from the current eight million barrels per day (MBD) to 20-25 MBD in the year 2000. This paper addresses the role of renewable energy sources and conservation in meeting the future energy demands of developing countries. It appears possible that renewable energy sources (biomass, solar, wind, small-scale hydro, and geothermal) could reduce that demand 8–15%. Of these sources, it is solar energy which appears to have the greatest potential in reducing oil demand. Possible applications include solar/thermal for water heating in industry and in commercial and residential buildings; solar/electric (central), involving large land areas of collectors, a tall receiving tower, special boilers, and turbogenerators; and solar/electric (decentralized), using photovoltaics for irrigation, village street lighting, public buildings, and residences. It is estimated that 10-20% of the LDC oil demand could be reduced through conservation. A lack of trained personnel and of institutions capable of developing and maintaining small-scale renewable energy systems are the principal obstacles to the utilization of these new energy sources. In addition, LDC governmental and private sector policymakers have maintained a cautious attitude regarding renewable energy sources — primarily due to their perception of the industrialized nations urging such sources upon LDCs without according them a high priority in their own nations. Another constraint to the use of renewable energy sources is the fact that the major lending and research institutions assisting developing countries are oriented to large-scale, capital-intensive technologies. Authors conclude that the nontechnical constraints to renewable and energy conservation strategies are the most formidable. They recommend that the U.S. and other industrialized nations step up their technical, economic, and institutional assistance in the development of these energy sources.

AID/SOD/PDC-C-0301 931000300

136 **PN-AAH-499**

SOLAR ENERGY, WATER, AND INDUSTRIAL SYSTEMS IN ARID LANDS: TECHNOECOLOGICAL OVERVIEW AND ANNOTATED BIBLIOGRAPHY

Duffield, C.
University of Arizona, Office of Arid Lands Studies.
1978, 163 p.

In Arid Lands Resource Information Paper No. 12

Solar energy technology is quickly coming to the forefront of existing and new energy systems. This paper provides an overview of solar energy technology, examining solar energy at the level of industrial ecosystems or technoecosystems, and the relationships of these systems to the arid lands of the world. The paper presents technoecology as a useful approach for understanding, designing, and managing solar-powered industrial systems and as capable of providing a basis for coherent, comprehensive, successful solar energy research and development strategy. The paper also discusses why solar-based civilizations may soon be a part of our world and makes projections about when they may arrive and what they may be like. Past, present, and future interactions of sunlight, water, and technoecosystems in arid lands are examined. This is done through a series of analogies comparing solar energy technoecosystems to biological ecosystems. These analogies include evolution, succession, symbiosis, niches, competition, optical concentration, and other phenomena which occur in both the industrial and biological worlds. Solar collectors are discussed as analogous to plants in design, organization, and arid adaptations. Photovoltaic solar cells are considered analogous to chloroplasts, but without the latter's need for water. In addition, the cost effectiveness of solar cells over the next few decades in relation to fossil fuels is discussed. The paper discusses, as one of its main themes, that within a few decades, solar power will replace fossil fuel power. Solar technologies for water processing are reviewed. Recommendations include: the need for effective international cooperation, development of cheap solar cells, and nurturing of a new solar consciousness. Attached to this technological overview is a 125-item, supplementary reference bibliography (1965–78). An extensive annotated bibliography of 100 references (1966–77) is also appended.

AID/ta-G-1111 211(d) 931015900

137 **PN-AAH-629**

TUNISIA ENERGY STUDY: A COOPERATIVE PROGRAM IN ALTERNATIVE ENERGY RESOURCES AND TECHNOLOGIES

Gorden, M.; Westfield, J.D.
Development Sciences, Inc..
1978, 25 p.

In October 1978, a team from the United States went to Tunisia to determine the preparedness of the Government of Tunisia (GOT) for a cooperative program in alternative energy resources and technologies. This project discusses coordination of alternative energy resources and technologies between the U.S. and Tunisia. The willingness of the GOT to act on these issues was evident and was displayed through the assembling of data and in processed data sets. A coordinated plan for fossil fuels is in place. A financial mechanism which is ideally suited for stimulating alternative energy technology is also in place. In regard to resource mobilization, although ample resources such as sun and wind exist, knowledge of appropriate technologies is limited. The major weakness in meeting the criteria applied lies in a lack of familiarity with the range of technologies of renewable energy. Training in these technologies through both "hands-on" and some formal presentation is needed. Recommendations for this plan include the following: (1) a program of in-country training, education by experience in alternative energy; (2) collaboration by the U.S. and Tunisia's Ministry of Agriculture in the design of a project to use alternative energy technologies in rural energy settings; (3) provision of a short-term U.S. specialist in central solar electricity generation; (4) assistance by A.I.D. to the Ministry of Energy in designing a study on alternative uses of organic material; and (5) organization of a technical trade or sales seminar on alternative energy technologies. A list of participants in this study as well as an 11-item bibliography in French and English which covers the period 1977–78 are appended.

AID/DSAN-C-0059 298003500

138 PN-AAG-936

POOR RURAL HOUSEHOLDS, TECHNICAL CHANGE, AND INCOME DISTRIBUTION IN DEVELOPING COUNTRIES: INSIGHTS FROM ASIA

Sisler, D.G.; Colman, D.R.
Cornell University, Department of Agricultural Economics.
1979, 321 p.

In Agricultural and Economics Research 79-13

Although the population of Asia is immense, its land mass vast, and its agriculture varied, one factor, rice, serves as a common denominator for this disparate group of nations and people. This report, concentrating on wetland rice production, assesses how the adoption of improved agricultural technology has influenced agricultural production and income distribution on small Asian farms. Asian rice yields have increased significantly over the past decade through use of modern varieties, fertilizers, agricultural chemicals, and water management techniques. Concern is increasing, however, as to the way in which the benefits have been distributed among rural families. The report begins with an overview of the research and study areas, and continues with discussions of patterns of household income, production systems, and household time allocation and labor market operation. A final section summarizes the findings and draws some conclusions and policy implications. It was found that mechanical technology and herbicides are not indispensible complements to the central "Green Revolution" components of modern varieties, fertilizer, and irrigation; and being substitutes for labor, they have no significant place in the production systems of labor-abundant small farms. Even though the new rice technology has had a significant positive impact on rice yields, output, and, to a lesser extent, employment in South and Southeast Asian countries, there is still much room for progress. Farmers have been highly receptive to the new seed-fertilizer technology and are very capable of perceiving what is to their economic advantage. The constraints causing farmers to underemploy resources were found to be largely outside their control, but susceptible to policy action. Another policy-related item is the direct influence of political intervention in the factor markets (e.g., target rice yields which exceed the economic optimum) on economic returns from adopting technology. A 24-item constraints bibliography (1965–78) and a 44-item general bibliography (1962–79) are appended.

AID/ta-C-1327 RES 931059400

139 PN-AAH-023

COMMUNITY ADVISORY GROUP DEVELOPMENT FOR LATIN AMERICAN RURAL COMMUNITIES: TRAINING OF ADVISORY GROUP FACILITATORS TRAINING MANUAL

Johnson, Gary L.
San Jose State University.
1978, 127 p.

A community advisory group (CAG) is a self-help group of citizens who serve as intermediaries between rural citizenry and formal organizational structures to bring together the human resource potentials within communities and the sociopolitical resources available at regional, state, and national levels. CAGs assess individual and community needs and promote self-development, community education and development, and national development. Without CAGs or other intermediaries, lower socioeconomic and rural populations, lacking formal education and formal group organizational structures, would remain dependent and subservient to outside controls. This training manual contains instructional methods used to train both CAG facilitators and members. The learning components, objectives, and activities of four instructional units are provided. Unit one, a basic communication unit, discusses one- and two-way communication, human transactions, and self-awareness. The purpose of this communication unit is to acquaint community members with the CAGs potential for personal, social, and economic development. Units two and three, concerning group membership dynamics and group leadership dynamics, describe the interpersonal skills needed by facilitators and members to function in a CAG. These skills include: identifying individual and community needs, learning to communicate in CAGs, and decisionmaking. The fourth instructional unit provides a basic understanding of CAG structure and methods. Topics discussed include the origin of CAGs, a survey to determine community needs, the participation of local organizations to promote CAGs, and the selection of CAG members. Each unit concludes with several related "experience activities", which are group exercises to be led by the facilitator. Because the rural campesino population of Latin America is largely illiterate, this manual relies on oral instruction. The manual is available in both English- and Spanish-language versions.

AID/la-G-1169 598057300
Also available in Spanish: PN-AAH-024, 160 p.

140 PN-AAH-226

A SELECT ANNOTATED BIBLIOGRAPHY OF SOCIAL SCIENCE MATERIALS FOR UGANDA, FOLLOWED BY AN EXPANDED BIBLIOGRAPHY

Hoben, S.J.
1979, 57 p.

Literature about the social sciences can be very beneficial to personnel working on development projects. This document contains a selected annotated bibliography and an expanded bibliography in order to identify available clearly written, nontechnical publications in the social sciences that will assist USAID personnel and contractors in planning and implementing development programs in Uganda. The selected annotated bibliography embodies three main headings. The first covers history, politics, and socioeconomic settings. Within the historical section, sources dating from pre-colonial times up to the rise and fall of Amin are included. The political section covers literature on both national and local political institutions and the ideological trends that are now influencing political developments in Uganda. The final section covers socioeconomic references that discuss some of the nation's 5-year economic plans. The second main section covers ethnic and regional background material. In particular, anthropological studies are cited and specific ethnic and regional groups are investigated. The last section covers social aspects of development topics relevant to Uganda, such as agriculture, education, health, women, and transportation. The expanded bibliography then follows, containing references to books, selected primarily from the social science field and published between 1969 and 1979, that relate to USAID development concerns in Uganda. A list of additional information resources is appended.

AFR/EA

141 **PN-AAH-254**

THE VALUE OF CHILDREN IN ASIA AND THE UNITED STATES: COMPARATIVE PERSPECTIVES

Fawcett, J.T.; Arnold, F.; Bulatao, R.A.; Buripakdi, C.; Chung, B.J.; Iritani, T.; Lee, S.J.; Wu, T.
East-West Center, East-West Population Institute.
1974, 74 p.

Papers of the East-West Population Institute, No. 32

How can the value of children be assessed? Although the task is difficult, research on the value of children is needed to better understand the determinants of human fertility and to suggest guidelines for fertility regulation policies. In this study, designed to provide knowledge of how different cultures perceive satisfactions and costs of children, the value of children is defined as twofold: positive values, or satisfactions, and negative values, or costs. Positive values include emotional benefits, economic benefits and security, self-enrichment and development, identification with children, and family cohesiveness and continuity; negative values include emotional costs, economic costs, restrictions or opportunity costs, physical demands, and family costs. Comparative findings from six countries are reported: Japan, Korea, China (Taiwan), the Philippines, Thailand, and the U.S. (Hawaii). For each country, results of three contrasting socioeconomic groups are analyzed: urban middle class, urban lower class, and rural. Results are based on interviews with 2,500 young couples having at least one child. About 360 couples were interviewed in each of the Asian countries, 557 in Hawaii to permit comparison of Caucasian, Japanese, and Filipino ethnic groups. Cross-culturally, childrearing is an activity characterized by ambivalence, but with benefits outweighing costs. Findings reveal a contrast between emotional benefits of having children emphasized by the urban middle class, and economic benefits emphasized by rural respondents, with the urban lower class falling between the two. Economic costs of children are of importance even to the more affluent middle class, although they are less concerned about financial costs than are other socioeconomic groups. The urban lower class show the most concern about costs. Population policy implications of the findings are discussed. Authors suggest that policy recommendations be made in a country-specific context with sociocultural factors considered. Suggested policies include old age pensions, parent education programs, large family taxation, etc. Descriptive tables and a 6-item (1968–74) bibliography are appended.

AID/pha-G-1058

142 **PN-AAH-273**

COMMUNICATIONS PRETESTING

Bertrand, J.T.
University of Chicago, Community and Family Study Center.
1978, 149 p.

In Media Monograph Series, No. 6

The majority of social development programs around the world stand to benefit from communicating their activities through the mass media. Most program administrators will invest in communication that will effectively reach a target population but will avoid squandering limited resources on costly productions that create negative results in the field. Through pretesting, the reaction of a group of individuals to a communication can be measured, resulting in the possibility of diffusing the most acceptable, most appropriate communication possible. In a "how-to" format, this monograph presents suggestions for pretest designs for radio and television spot announcements, posters, pamphlets, and movies, as well as techniques in initially designing, conducting, and analyzing the results of the pretest. For any type of media, pretests are designed to identify those messages which are potentially most effective, namely, which are: most attractive and gain the most attention; most easily understood; most acceptable and least likely to create a negative reaction; best at creating the feeling of self-involvement with the topic; and most persuasive. The pretests presented in this pamphlet all adhere to the following criteria: they are economical; they require no special pretesting equipment or test facilities; they can be carried out by people with limited research training; most are appropriate for use in developing countries with nonliterate populations; and they yield results that can be hand tabulated for rapid feedback to the communications staff. Personnel who should be involved in this activity include the director of the organization (to ensure that the pretest is being implemented in ways which will improve the communications program) and members of the research division (to objectively evaluate the pretest results). When a separate research division is not available, the communication staff itself may evaluate the pretest; however, the persons who designed the pretest should neither conduct the pretest nor tabulate the results. At the conclusion of the monograph, the author provides four sources (1968, 1973, 1975) for further reference.

AID/csd-3314 931095800

143 **PN-AAH-469**

MARGUI-WANDALA DIVISION (NORTH CAMEROON): AN ANNOTATED BIBLIOGRAPHY

Nkwi, P.N.; Kamanda, B.; Nassourou, S.
Yaounde University, Department of Sociology.
1979, 81 p.

The present situation of the ethnically diverse peoples of the Margui-Wandala Division of Cameroon can only be understood in the light of their past history. These ethnic groups may be divided into two broad categories on the basis of the predominant factor of religious affiliation: an influential Moslem minority, and the Kirdi, or pagan, majority. The latter is a farming people of animist belief who have been forced to take refuge in mountain villages by historical vicissitudes. There they have remained cut off from the outside world and from change, while surviving harsh conditions in adapting to the natural environment. Their persistence in living in isolated areas has caused great problems of conscience for the Government of Cameroon, which is doing everything possible to bring these people to the plains and to the benefits of modernization. Ethnic values are firmly ingrained, however, as is the fear of the consequences of transportation to the plains. This annotated bibliography on the history and characteristics of the Kirdi peoples, as well as of the Moslem, has been prepared for those involved in assisting these people in the process of development. The bibliography has been compiled in three parts. The first part gives a general summary of central themes covered by the authors including: historical background, populations, social structure, kinship structure, habitation, marriage, religious beliefs, political organization, agriculture, and migration and resettlement. The second part presents each bibliographic entry with a brief annotation. The third section discusses works which were unable to be annotated. The bibliography consists of 60 entries, (1951–79) mostly in French with a few in English, 49 of which are annotated.

144 **PN-AAH-473**

THE SOCIOLOGY AND POLITICAL ECONOMY OF THE SAHEL: AN ANNOTATED BIBLIOGRAPHY

Horowitz, M.M.; Lewis, J.V.
Institute for Development Anthropology (IDA).
1979, 35 p.

Prepared for the Workshop on Social Analysis of Development Programs and Projects

Development officers and contractor personnel who work with programs in the Sahel can benefit from using this 171-item (1912–78) annotated bibliography on the Sahel's sociology and political economy. The bibliography was prepared to assist these personnel in the identification, design, implementation, and assessment of socially sound programs and projects which both benefit rural low-income Sahelian populations and are based on their needs, interests, and participation. Widely available monographic material is stressed. First, those bibliographic materials and studies which are general or regional in nature are listed, followed by alphabetical listings by country, namely: Cape Verde and Guinea-Bissau, Chad, Gambia, Mali, Mauritania, Niger, Senegal, and Upper Volta. French and English language entries are included. Periodical literature, most "social soundness analyses" prepared for A.I.D. project papers, and items produced under A.I.D. research grants and contracts are omitted, since these materials are widely distributed in the region and are easily available from the A.I.D. Research Center. The authors recommend that Missions subscribe to those journals which are rich in pertinent development material, such as *Etudes Rurales, African Environment*, and *Africa*.

AID/afr-C-1469

145 **PN-AAH-474**

AN ANNOTATED BIBLIOGRAPHY OF THE SOCIOLOGY AND POLITICAL ECONOMY OF SOMALIA, SUDAN, AND TANZANIA

Fleuret, P.; Jama, M.A.; Laitin, D.; Murdock, M.S.; Thomas, G.L.
1979, 17 p.

Development officers and contractor personnel who work with programs in Somalia, Sudan, and Tanzania can profit from using this annotated bibliography of the sociology and political economy of these countries. The bibliography was prepared to assist these personnel in the identification, design, implementation, and assessment of socially sound programs and projects of benefit to rural low-income populations. The selections are based on the needs, interests, and participation of this target group. Monographic material is stressed. The bibliography contains 62 entries arranged by country with entries in English, Italian and French. Most bibliographic items are accompanied by abstracts and cover the period 1962–79.

AID/afr-C-1504

146 **PN-AAH-530**

INDIVIDUAL, FAMILY AND VILLAGE LITERACY IN DEVELOPMENT

Nesman, E.G.; Rich, T.A.; Green, S.E.
South Florida University.
1980, 161 p.

Based on data from the Basic Village Education Project in Guatemala

Literacy has long been considered the key to the adoption of modern agricultural practices by traditional farmers. Past studies undertaken to confirm this assumption have focused solely on the individual. The purpose of this study is to expand that focus to include both the family and the village in determining the relationship between literacy and the adoption of modern agriculture practices. Data for this study were obtained from A.I.D.'s Basic Village Education Project in which 1,300 farmers and their families were profited. Major findings include the following: (1) Membership in a highly literate family is related to the increased use of modern agricultural practices — regardless of whether the farmer is literate himself. (2) The relationship between family literacy and the adoption of modern agricultural practices was not dependent upon the age of the farmer, the size of the farmer's holdings, or general living conditions. (3) Membership in a literate village is not consistently related to the use of modern agricultural practices. For example, the relationship did not hold true for farmers living in the Indian Highlands — demonstrating that the influence of literacy can be mitigated by cultural factors. (4) In contrast to family literacy, individual literacy has no measurable relationship to the increased use of modern agricultural practices. In conclusion, the current study indicated that while individual literacy has no consistent relationship to change in agricultural practices among traditional farmers, family literacy does indeed seem to be an important factor. Report includes a bibliography (58 items, 1933–78) and appendices (interview questions, scoring procedures, a list of items comprising the agricultural practice index, a listing of materials used in the field validation study, a cross-tabulation of literacy by school attendance, and profiles of literate farmers, families, and villages).

AID/DSPE-C-0040 931000100; 520022800

147 PN-AAH-613

FURTHER EVIDENCE OF THE TRANSITION IN THE VALUE OF CHILDREN

Bulatao, R.A.
East-West Center, East-West Population Institute.
1979, 92 p.

In Papers of the East-West Population Institute, No. 60-B

Why are successive generations of parents having fewer and fewer children? Demographic studies have noted this transition from high to low fertility rates and are attempting to answer this question. This paper argues that a central reason for the fertility decline is a set of changes in parents' perceptions of specific values and disvalues attached to children. Children become less valuable in one sense, but they also become valued for different reasons and the burdens they impose on parents are altered both quantitatively and qualitatively. Taken collectively, these changes have been labeled "the transition in the value of children," a theory which attempts to explain long-term changes in fertility levels that accompany modernization. First, the theory and past literature, which was limited to seven Asian and two Western countries, are briefly reviewed. New evidence from countries in Africa, Latin America, Europe, Asia, and Oceania are presented in the remainder of the paper in an attempt to confirm the theory. Thus, to supplement the evidence of this transition from nine countries reported in a previous paper (Bulatao, 1979), data from an additional 14 countries are considered in this paper. Cross-national comparisons are made among values and disvalues attached to children. The new data reinforce the previous findings. Conclusions drawn were that the fertility transition is due to vanishing economic roles for children; a rise in the aspirations people have for their lives; disinterest in being financially and physically burdened by children; emergence of the conjugal family with its rewarding parent/child interactions yet marital strains; weakening cultural props for high fertility in terms of social benefits and overpopulation; and infant mortality reduction. The transition in the value of children is seen as a dual process of liberation. First, children are liberated from premature death and from having to work, and are awarded a special protected status; then, parents are liberated from the burden of caring for many children and can claim personal fulfillment as a right. Illustrative tables and a 32-item bibliography of Danish and English titles covering the years 1967–79 are appended.

AID/DSPE-C-0002 932064800

Caring for the future – a woman awaits family planning counselling in Pakistan.

148 PN-AAG-801

MAURITANIA: SHELTER SECTOR ASSESSMENT

Perta, J.; Fourcade, R.; Hammam, S.; Light, F.D.
1979, 176 p.

The shifting of one-third of Mauritania's population within 12 years (1965–77) from a nomadic lifestyle to one of rural/urban settlement altered the societal structure, economy, and settlement patterns. To assist the Government of Mauritania (GOM) in assessing its shelter sector, a team of consultants examined shelter population characteristics, dimensions of shelter problems, and shelter delivery system components. Recommendations to improve shelter delivery system effectiveness include: (1) removing economic constraints and encouraging system expansion; (2) improving the capabilities of shelter institutions; (3) adopting a spatial development planning policy to stabilize resettlement groups; (4) subdividing and allocating land to grant tenure to low-income families to enable them to construct permanent units; (5) avoiding high costs and family disruptions accompanying extensive relocation; (6) recapturing costs of extending public fountains systems into low-income areas; (7) designating specific refuse disposal areas; (8) promoting pit latrines for human waste disposal and self-help construction programs; (9) encouraging the production and use of local building materials; (10) mobilizing family savings directed to shelter financing; and (11) raising monthly payments on construction units to ensure that the GOM construction agency can prevent potential bankruptcy. A 64-item bibliography (1974–78) of English- and French-language titles is included, as are analyses tables.

AID/otr-C-1453 912046800
Also available in French: PN-AAG-802, 157 p.

149 PN-AAH-119

GUIDELINES FOR URBAN AND REGIONAL ANALYSIS: TYPES OF ANALYSES APPLICABLE TO A.I.D. ACTIVITIES

Rhoda, R.E.
United States Agency for International Development, Technical Assistance Bureau, Office of Urban Development.
1976, 110 p.

Careful analysis of the developmental context and anticipated impacts of prospective projects is essential in successful development efforts. This report describes types of urban and regional analyses relevant to A.I.D. activities. While not intended to be a "how-to" manual, the report presents guidelines to assist field missions in formulating, justifying, and designing urban and regional projects and programs. It is noted that the type and level of analysis to be implemented depend upon the country situation, development assistance strategy, and types of projects anticipated. Ten types of analyses, of varying degrees of complexity, are discussed and include those of national policies of urban and regional development; the distribution and characteristics of the poor; the distribution of development and underdevelopment; the system of central place service centers; migration; key urban-rural linkages; urban administration and the delivery of essential services; urban employment and functions; and social analysis of the urban poor. Each section provides a brief description of the type of analysis, its relevance to A.I.D. activities, typical questions addressed by the assessment, sources of data, and references (1955, 1964–66) for further information. Three applications of the analyses to project development are presented: to establish network centers for regional development; to improve the well-being of slum residents in the capital city; and to increase employment in an intermediate-sized city.

TA/UD

150 PN-AAH-491

KENYA SHELTER SECTOR STUDY AND A.I.D.'S EXPERIENCE

Jorgensen, N.O.
United States Agency for International Development.
1979, 247 p.

In Kenya, the need for improved rural and urban housing developments has become critical. This study, conducted in 1979 by A.I.D., examines this need in three sectors of the country and is supplemented by an evaluation of A.I.D.'s experience in urban shelter, housing finance, and rural shelter. In regard to the urban shelter sector, the authors note recent encouraging changes. Foreign donors, such as A.I.D., the World Bank, the Commonwealth Department Corporation, and the European Development Fund, have channelled more of their resources toward improving Kenya's urban housing needs. Major projects have been moved away from Nairobi to upcountry towns where they are needed. Public agencies have altered their shelter designs so that they conform more to current needs. Finally, the institutional capacity of shelter delivery agencies has been strengthened. The authors recommend that urban shelter study programs be set up immediately; that target groups for the housing agencies be clarified; that emphasis be placed upon private sector construction; and that all assistance encourage self-reliance. Within its housing finance sector, Kenya does have a good financial infrastructure and the growth of credit and saving societies has been encouraging. Also, contributions made towards voluntary support projects have been increasing. On the other hand, because the banking system has favored the urban sector, it must place more emphasis in the future on promoting rural projects. In addition, the Central Bank must extend its credit services towards housing financial institutions. The Government, which has done well in raising revenue, can increase its sources by raising revenue from import duties and income taxes. Local authorities have not done as well and their procedures for collecting property taxes and housing revenues should be reviewed. In the rural sector, Kenya has shown little interest in the past in rural development and the current development plan should help. The National Housing Corporation's rural housing loan and the role of the provincial housing officers must be strengthened. Building materials should be decontrolled and related infrastructure facilities improved. A bibliography of 27 items (1966–78) is included.

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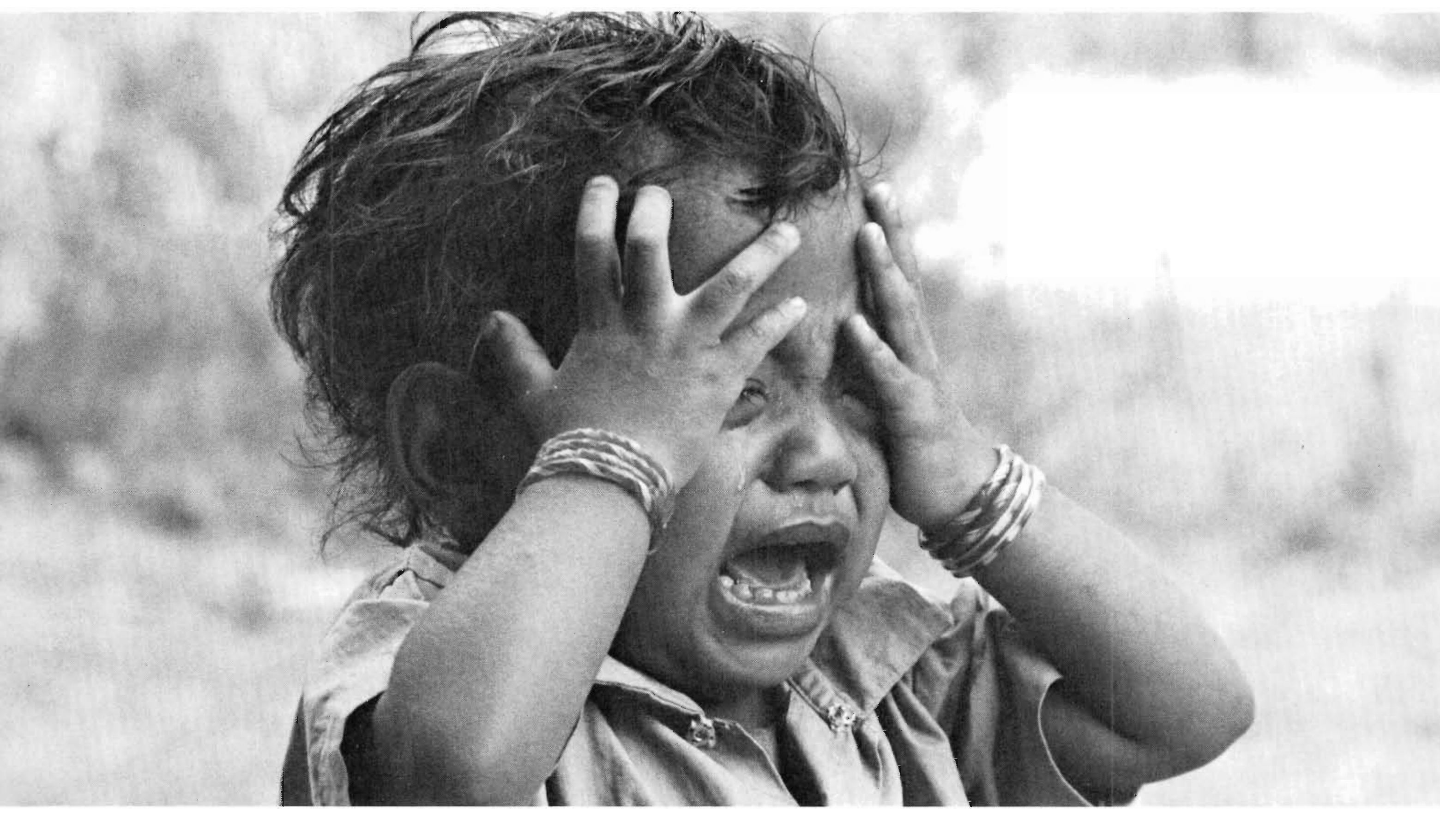

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