

A.I.D. RESEARCH & DEVELOPMENT ABSTRACTS



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FROM THE EDITOR

Women in Development and A.I.D.'s Strategy

Women are unequal recipients of the benefits of economic development and as such need to be targeted in new development initiatives. Changes in the economies of developing nations are altering the traditional division of labor, leaving women with primary responsibility for up to 30% of the world's households and with growing responsibility for fulfilling the basic survival needs of all families. Unfortunately, an estimated 41% of households headed by women are unable to satisfy these basic needs due to a lack of income-generating opportunities—a lack which is rooted in traditional sociocultural patterns and echoed by modern development practice.

Traditional societies provide boys with more schooling and better food and value women almost exclusively for their childbearing capacity; they also demand that women bear the double burden of meshing maternal and familial responsibilities with income-generating activities. However, because women's work is generally oriented toward the home rather than the formal cash economy and is thus difficult to quantify, women have been neglected by development planners. The vast majority of development initiatives have focused on providing men with the skills, training, and technology needed for work in the modern industrial sector. Correspondingly, there has been a paucity of initiatives targeting women.

Locked in the traditional, labor-intensive economy in which the technologies for domestic tasks and subsistence agriculture have remained virtually unchanged, women are marginalized as the poorest of the poor. In addition, women are constrained in their search for employment by discrimination, the economy's reliance on capital-intensive production processes, and by legislation that "protects" women—often by limiting their access to credit and land ownership. The jobs available to women are thus low-status and dead-end, offering little security and low, erratic earnings.

Recognizing these problems, A.I.D. created the Office of Women in Development (WID) in 1974 and directed that a "conscious concern" for women be incorporated into all activities within A.I.D. development programs. In addition, A.I.D. has, since 1978, funded special women-specific projects, women's component projects, and selected health, nutrition, and population projects which focus on empowering women with the skills they need to integrate themselves into the economies of developing countries, thereby improving women's status and assisting the total development effort.

This issue of *ARDA* includes many citations of reports on WID projects and on the broader issues bearing on women's role in development. Complete information resources and a serviceable evaluation scheme are paramount in planning effective WID projects. Presented in item 064 is an annotated bibliography which integrates the fast-growing pool of literature addressing women's incorporation into the development process, while weaknesses in data collection are examined in item 063, with special emphasis on data gaps regarding women's

economic activities and contributions to the labor force. A survey of rural Paraguayan women (item 061) provides data on the female rural population, particularly on households headed by women. Other citations in this issue address the problems and possible remedial policies and programs associated with women's access to technology and credit (item 071); constraints to women's employment (items 062 and 070); and hardships inflicted upon women who reside in regions which benefit from male-oriented agricultural programs (item 060).

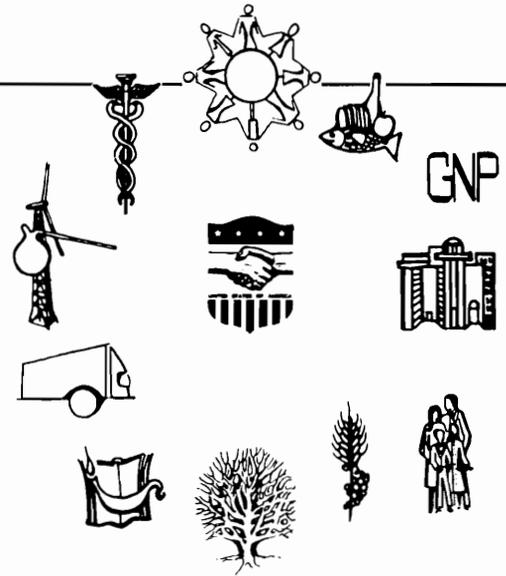
Major attention is given to the role of women's organizations in achieving WID objectives. The benefits of utilizing and supporting such organizations as intermediaries between donors and developing country women are examined in item 068. Members of these organizations need assistance—as summarized in item 066—in designing projects which promote self-sufficiency and in publicizing women's issues in order to achieve greater political power. Item 067 argues that women's political prospects increase only to the extent that the political system recognizes organizational rather than socioeconomic status as the basis for participation and incorporates independent groups such as women's organizations. In item 069, criteria are set forth for measuring the development effects of giving small grants to women's organizations. The design and implementation of small innovative projects involving women's groups in Africa are assessed in item 073.

Basic to women's participation in development is their health, a function of nutrition, childbearing, and other factors. The findings of the International Symposium on Women and Their Health are reported in item 072. Breastfeeding is investigated in relation to infant mortality (item 105) and fertility (items 134 and 137); item 127 provides a bibliography on the general theme of breastfeeding and infant health. The planning of a national maternal and child health and family planning program in Rwanda is reviewed in item 141. Other strategies for improving women's socioeconomic, health, and nutritional status in order to decrease fertility are set forth in item 065. The future role of intrauterine devices is debated in item 140, while item 138 provides a model questionnaire for use in contraception prevalence surveys and item 139 compares contraceptive use in 19 countries. Relative fertility declines among different socioeconomic, ethnic, and regional groups in Sri Lanka are analyzed in item 133.

Clearly, innovative programs alone will not emancipate women and ensure them a steady basis for reaping the benefits of development. A heightened awareness in both developing and developed countries of women as worthy, integral members of society must occur before measurable changes in women's status will be seen. It is in this context in which A.I.D.'s Office of Women in Development materially supports women's active role as both agents and beneficiaries of development and promotes women's rights to a role in development, not as a Western ideal imposed upon the Third World but as an idea with worldwide acceptance and interest.

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ARDA is published quarterly by the United States Agency for International Development, Washington, D.C.

ITEMS OF SPECIAL INTEREST

This issue of *ARDA* highlights several reports produced by A.I.D.'s Economic and Social Data Services Division. To obtain microfiche or paper copies of these publications, please refer to the *ARDA* Ordering Instructions; you will be invoiced later. For more information, contact the Agency for International Development, DIHF/ESDS, 7222 47th Street, Chevy Chase, MD 20815, U.S.A.; Phone (301) 657-9319.

ALLDATA Reports are separately available for 177 countries and contain all of the most recent statistics from A.I.D.'s Economic and Social Data Bank for a given country. The information in these reports is continually updated and expanded as new material becomes available. *Specify country when ordering; available in paper only.*

An **Inventory of A.I.D. Micro Data Sets for Developing Countries** summarizes over 200 post-1974 data collection activities which have yielded valuable but often overlooked micro-level information on demography, health, nutrition, agriculture, housing, energy, natural resources, and education. Names of principal contacts for obtaining further information and publications are included. *Order as PN-AAK-957.*

The **Statistical Profile Series for A.I.D. Assisted Countries** reflects an ongoing effort to present data on sectors of priority concern to A.I.D. Currently available are **Indicators of Nutrition in A.I.D. Assisted Countries** (PN-AAL-272); **Indicators of Food and Agriculture in A.I.D. Assisted Countries** (PN-AAK-275); and **Indicators of Education in A.I.D. Assisted Countries** (PN-AAK-276). Additional reports are planned on energy, population, housing, and natural resources.

World Indices of Agricultural and Food Production, 1972-1981 presents indices of total and per capita agricultural and food production for 108 countries and the world. The one-volume report was prepared by the U.S. Department of Agriculture's Economic Research Service with partial funding provided by A.I.D. *Order as PN-AAL-271. Also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 for MF \$4.00 and PC \$15.00.*

Reports of **Selected Statistical Data by Sex** are available separately for 69 countries and offer economic and social data disaggregated by sex, age, and residence for a variety of demographic, education, health, household, income, and employment variables in order to facilitate a better understanding of the role of women in AID-participating countries. *Specify country when ordering.*

The **Economic and Social Data Bank Data Element Dictionary** provides detailed definitions, data sources, and other information for each statistical data element in A.I.D.'s automated Economic and Social Data Bank. Elements are arranged by economic and social categories and by a hierarchy of sub-categories. *Order as PN-AAK-963.*

Country Development Strategy Statement Data Abstracts, available for most AID-assisted countries, provide a selection of economic and social progress indicators. Included are such subjects as national income, agriculture, foreign assistance, income distribution, health, and employment. Data are presented in tabular form as well as through computer drawn maps and charts. *Specify country when ordering.*

The **Congressional Presentation Economic and Social Data for A.I.D. Assisted Countries**, compiles in one volume for each fiscal year economic and social statistics for A.I.D. recipient countries. The report is divided by region—Africa, Asia, Latin America, and the Near East—as well as by recipients of development assistance and economic support funds. *The FY 1983 volume is available as PN-AAK-956.*

QUESTIONS AND ANSWERS ABOUT ARDA

What is ARDA?	<i>ARDA</i> , "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 Science and Technology.
What is the goal of ARDA?	The goal of <i>ARDA</i> is to transfer development and technical information to active practitioners in development assistance.
For whom is ARDA published?	<i>ARDA</i> '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.
What materials are abstracted in ARDA?	<i>ARDA</i> presents abstracts of AID-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.
To whom do I address additional questions regarding ARDA?	Please direct all correspondence and requests for further information to: Editor of <i>ARDA</i> S&T/DIU/DI Agency for International Development Washington, D.C. 20523 U.S.A.

QUESTIONS ET REPONSES RELATIVES A ARDA

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Quel est l'objectif d'ARDA?	Le but d' <i>ARDA</i> est de transmettre des informations techniques sur le développement à ceux qui prêtent assistance au développement.
A qui s'adresse ARDA?	<i>ARDA</i> s'adresse au personnel d'A.I.D. dans le monde entier et à certaines institutions clés situées dans les pays en voie de développement. Ces institutions comprennent des agences de gouvernement, des universités, des bibliothèques, des organisations de recherche, et d'autres organisations dans les secteurs publics et privés.
Que contiennent les résumés d'ARDA?	<i>ARDA</i> présente des résumés des recherches actuelles et moins récentes financées par A.I.D., des rapports sur l'état actuel du développement, des analyses de différents domaines, des évaluations spéciales, et d'autres documents. Le tout ensemble décrivent une vaste étendue d'expériences dans le domaine du développement international.
A qui est-ce qu'il faut poser des questions supplémentaires au sujet d'ARDA?	Veuillez envoyer toute correspondance et toute demande de plus amples renseignements à: Editor of <i>ARDA</i> S&T/DIU/DI Agency for International Development Washington, D.C. 20523 U.S.A.

PREGUNTAS Y RESPUESTAS SOBRE ARDA

¿Que es ARDA?	<i>ARDA</i> , "A.I.D. Research and Development Abstracts" (Resúmenes de Investigación y Desarrollo de la Agencia para el Desarrollo Internacional), es un periódico trimestral de resúmenes editado por la División de Documentación e Información, Oficina de Información sobre el Desarrollo y su Utilización, Departamento de Ciencia y Tecnología.
¿Cual es el objetivo de ARDA?	El objetivo de <i>ARDA</i> es comunicar información técnica y sobre el desarrollo a los participantes activos en las actividades del desarrollo.
¿Para quien se publica ARDA?	<i>ARDA</i> se dirige al personal mundial de A.I.D. y a las seleccionadas instituciones claves de los países en desarrollo. Tales instituciones cuentan con agencias de gobierno, universidades, bibliotecas, organizaciones de investigación, y otras organizaciones de los sectores público y privado.
¿Que contienen los informes de ARDA?	<i>ARDA</i> presenta resúmenes de estudios actuales y menos recientes financiados por A.I.D. relativos a la investigación, de informes sobre el estado del arte, de analisis de sectores, de evaluaciones especiales, y de otros documentos, los que todos juntos describen un panorama extensivo de experiencias dentro del dominio del desarrollo internacional.
¿A quien se dirigen preguntas adicionales sobre ARDA?	Sírvase remitir toda la correspondencia y los pedidos de más información a: Editor of <i>ARDA</i> S&T/DIU/DI Agency for International Development Washington, D.C. 20523 U.S.A.

USER'S GUIDE TO ARDA CITATIONS

Item number	101	PN-AAK-592		
		MF \$3.24/PC \$28.47		Document number
Title	Soybean seed quality and stand establishment; proceedings			Microfiche/ Paper Copy prices
Author(s)				Sinclair, J.B.; Jackobs, J.A.
Institution(s)	University of Illinois at Urbana-Champaign. College of Agriculture. International Soybean Program			Publisher
Meeting	(Conference on Soybean Seed Quality and Stand Establish- ment, Colombo, LK, 25-31 Jan 1981)			
Supplementary note(s)	<i>INTSOY series, no. 22, 1982, xiii, 206 p., En</i> Published by University of Illinois at Urbana-Champaign <i>Grant DAN-1406-G-00-1015-00</i>			
Project number	93105600			
Contract/Grant	AID/ta-C-1294			

Soybean research has shown that both physical and biological factors are responsible for reduced seed quality and vigor, that stand establishment depends on seed quality, and that seed quality is directly influenced by weather conditions during seed maturation and harvest and by subsequent storage conditions. Because knowledge of these facts remains largely fragmented and is not being communicated to farmers, the International Soybean Program (INTSOY) hosted an international conference in Sri Lanka for research scientists and extensionists to correlate current knowledge on soybean seed quality and stand establishment, discuss ways to communicate this knowledge to farmers, and determine future research needs.

The conference proceedings presented in this volume include: (1) 19 invited papers and abstracts of 13 volunteered papers on soybean seed maturation, genetic differences in seeds, the effect of weather, harvesting and planting procedures, and the role of insects and pathogens; (2) 11 country reports from various Asian nations; and (3) reports from three working committees on soybean production, crop protection, and storage and mechanization

In the plenary sessions, the speakers voiced a number of proposals on what emerged as a major concern among the delegates—the importance of seed quality in expanding soybean production in tropical and semi-tropical areas. Pointed out in particular was the complexity of soybean seed production in the tropics and semi-tropics due to the high humidity and temperature levels that prevail throughout the year. Other themes sounded were the necessity for good seed to make soybean an economical crop and the nutritional importance of soybeans.

All information presented during the conference related to seed production, technology, and storage and to seed certification in tropical and semi-tropical developing countries. Such information is directly related not only to INTSOY goals, but to complementary efforts of other international donors such as the Food and Agriculture Organization's ongoing Regional Field Food Crops project in North Africa and the Middle East.

Abstract

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001

PN-AAH-956

MF \$1.08/PC \$7.80

State-of-the-arts paper (SOAP) on techniques of enumeration of intercropping and associated cultivation and livestock numbers and products in subsistence agriculture in LDC's

Stallings, J.S.

Auburn University. Department of Agricultural Economics

1980, 59p. : En

6980135

AID/afr-C-1607

Unlike highly-developed economies with a high degree of commercial agriculture, subsistence agriculture in developing countries poses special enumeration problems—cropping systems are often complex and non-standardized, farmer illiteracy often precludes the use of mail questionnaires, educated enumerators are lacking, etc. This state-of-the-arts-paper, based on a literature review and interviews with experienced U.S. personnel, reviews techniques currently used in developing countries for enumerating area and production in intercropped (two or more crops growing simultaneously in the same plot) or associated cultivation (e.g., triple cropping) and for enumerating livestock and livestock products.

The author begins by outlining the eight steps involved in conducting a sample survey and analysis of subsistence agriculture in a developing country: plan the survey; conduct public relations for the survey; pre-test instruments, procedures, etc.; conduct the survey; analyze data; publish results; use results to formulate plans and policies; and critique results for future surveys. Enumeration problems most frequently faced in developing countries are then reviewed and alternative enumeration techniques appropriate to solve these problems are provided. For example, a crop plot often contains non-productive areas such as paths, ditches, erosion barriers, and weed patches. The recommended technique for measuring such land is to count the non-productive area if man-made and associated with the production of crops (i.e., irrigation ditches, access strips, erosion barriers, etc.) and to exclude natural, non-productive areas if they constitute more than 5% of the total plot.

Presented are 22 enumeration techniques for determining crop growth and area; 16 techniques for determining crop production, consumption, and sales; and 6 techniques for determining livestock numbers and ownership. Also provided are specific enumeration recommendations for the developing African nation of Rwanda. The author found few data on livestock and livestock product enumeration in developing countries and recommends further study and pre-testing on the subject.

Appendices include a report on agricultural survey methods in developing countries, a list of contacts, and a 48-item bibliography (1959-80).

002

PN-AAJ-400

MF \$1.08/PC \$9.75

Land tenure and agricultural development in Lesotho and Swaziland: a comparative analysis

Doggett, C.L.

1980, 64p. : En

Can communal land tenure's inherent constraints to production be eliminated by freehold land tenure while preserving social and economic equity? Although Lesotho and Swaziland historically practiced communal land tenure, their methods of modernizing land tenure practices, the subject of this report, have differed.

Land in both countries was allocated on the basis of need, was used for the common good, and could not be bought or sold. The unravelling of traditional land tenure in Lesotho, due to population pressure and the emergence of a cash economy fueled by South African wage employment, resulted in landlessness, less farming, food imports, faster soil erosion, the decline of traditional authority, and a skewed income distribution favoring miners. Lesotho reacted by passing legislation to provide increased tenure security, rationalize land values through leases and licenses, solidify the power of village committees, formalize land inheritance, and differentiate urban from rural land use and progressive from subsistence farming. Communal tenure was thus maintained but refined.

Swaziland, although sharing much in common with Lesotho, took a different path. Competing claims to ownership between Swazis and Boers resulted in a checkerboard of traditional maize farming on communal land (57%) and modern, intensive cultivation of cash crops (e.g., tobacco and cotton) on private land (43%). The Swazi Government has clearly stated its opposition to reform, and dualism is reinforcing itself. Thus, it appears that land ownership, although not a panacea to development, may be a prerequisite.

Communal land tenure was not inflexible and suited a subsistence economy, but it has become outmoded and inefficient. The emergence of a landless class in both societies seems inevitable and will require new approaches to meet progressive farmers' needs and to provide social security. Development donors must: (1) recognize that land is used for more than agricultural production; (2) realize land tenure helps determine land use and people's regard for land; (3) be aware of differences among small farmers; (4) utilize a systems approach in agriculture; and (5) be able to competently and professionally work with host country officials.

A 53-item bibliography (1947-80) is appended.

003

PN-AAJ-402

MF \$1.08/PC \$5.85

Farming systems components for selected areas in India: evidence from ICRISAT

Binswanger, H.P.; Virmani, S.M.; Kampen, J.

International Crops Research Institute for the Semi-Arid

Tropics

ICRISAT Research Bulletin, no.2, 1980, 44p. : En

931097200

AID/ta-G-1421

Research on natural watersheds in India has shown that using more input-intensive farming systems than those presently used in the semiarid tropics can substantially raise farm profits. This report outlines successful soil and water management, cropping, runoff collection, and supplementary irrigation systems for use in the semiarid tropics.

On deeper vertisols, intercropping maize and pigeonpeas is more profitable than maize and chickpeas; crop cover reduces runoff and soil erosion; contour bunds also reduce runoff and erosion but cause waterlogging in the monsoon season; broadbeds and furrows give greater yields and higher profits than flat planting, reduce runoff, and save bullock time during primary



AGRICULTURE

tillage; and while crop management across field boundaries is extremely difficult for small groups, short-term group efforts to improve soil and water management appear feasible.

For shallow vertisols, intercropping maize and pigeonpeas produces higher yields and profits than maize and chickpeas; post-monsoon cropping based on residual moisture is impossible; crop cover reduces runoff and also reduces soil losses to acceptable levels; contour bunds cause waterlogging losses in rainy season crops; broadbeds and furrows are aided by fertilization; although broadbeds and furrows do not markedly decrease runoff or erosion or raise yields or profits, soil and crop management do increase yields and profits.

Finally, in alfisols, broadbeds and furrows, as currently practiced, usually increase runoff and may lead to substantial soil loss; yields and profits do not vary significantly whether broadbeds and furrows or flat cultivation are used; contour bunds reduce runoff and soil loss; and soil and crop management raises yields and profits moderately.

Appendices include a list of immediate research priorities, along with medium-and long-term objectives in classifying semiarid tropic production schemes; a 13-item bibliography (1971-80); and a table of data on runoff, soil loss, yield, and profitability.

004

PN-AAJ-656

MF \$4.32/PC \$41.60

Baseline study of agricultural research, education, and extension in Guyana

South-East Consortium for International Development
Tuskegee Institute
1981, 319p. : En
504000030
AID/lac-C-1403

To assist the Government of Guyana (GOG) in developing its agricultural sector, this AID-funded study provides qualitative and quantitative baseline data on the current status and needs of the country's agricultural research, education, and extension (REE) system. Data in the study were gathered by reviewing literature and interviewing key GOG and USAID/Guyana officials.

The role of agriculture in the Guyanese economy, its impact on the REE system, and an outline of the agricultural sector's institutional organization are presented. A rather lengthy analysis of the REE system is also provided, detailing each of the sector's resource allocations, institutional structures, and current developments. Recommendations for improving the current REE system are outlined in the final chapter.

The study's key findings reveal that: (1) there has been no systematic attempt to use the REE system to address the GOG's stated goal of self-sufficiency in food and fiber; (2) Guyana's REE system is highly fragmented, especially in the research and extension components; (3) there is a lack of trained personnel and sufficient funding; (4) the few well-qualified REE personnel are often spread too thinly and occupy administrative rather than teaching, research, or extension positions; (5) the current system is in flux due to frequent personnel turnover and reorganization; and (6) the existing system often inappropriately reflects the characteristics and goals of its colonial origins.

The authors recommend that the REE system as a whole be reorganized into an integrated and cooperative structure utilizing all available resources; that sufficient numbers of competent personnel be recruited, maintained, and rewarded; and

that a transportation infrastructure be developed to permit REE travel and extension throughout the country. More specific recommendations relating to research, extension, and education are included.

Appended are proposed projects which might be funded by international donors to improve GOG's REE system, a list of people contacted during the study, a 75-item bibliography (1960-81), and a proposed curriculum and donor project for the University of Guyana.

005

PN-AAJ-658

MF \$3.24/PC \$35.10

Kenya national crop storage study

Development Planning and Research Associates, Inc.
1980, 267p. : En
615016900
AID/afr-C-1562

Crop losses during storage can have a significant impact on farmer income and on a nation's ability to reduce food imports or increase exports. This report discusses post-maturity losses of major food crops (corn, beans, sorghum, and millet) in Kenya.

Crop samples were collected from small farmers, rural markets, and crop collecting and processing groups and were analyzed for bird, rodent, mold, and insect damage; for corn, tests were also made for aflatoxin contamination. Results indicate corn losses exceeding 16%, with 6% occurring between maturity and harvest and 10% between harvest and consumption. To reduce these losses, the following practices are recommended: harvest corn at physiological maturity (4-8 weeks earlier than at present) to reduce field losses; sun dry corn on platforms until a safe storage moisture level (13-14%) is reached; and shell and apply an insect protectant to grain that is to be stored for more than 3 to 4 months (about half the crop). These procedures are estimated to reduce losses to 4.5%. Estimated investment in farm facilities is 200 KES and the return to labor for the farmer is about 3 KES per hour. The techniques involved are already known in Kenya and used on a limited basis or for other crops. These techniques could also reduce losses for beans (currently about 4%) and for sorghum (which, based on limited sampling, may be even higher than for corn). No losses were found in the eight samples of millet collected.

A proposed project to implement a grain loss reduction program is presented. Major components include providing grants to farmers to install improved facilities; having formal training programs for farmers; establishing a Post-Harvest and Storage Section within the Ministry of Agriculture; conducting educational programs ranging from short courses for extension agents to university education for agricultural personnel; and strengthening the research program to develop and test new loss reduction techniques.

A 116-item bibliography (1953-79) and additional references for each chapter are included. An appendix provides information on weather, corn storage, farmer survey and grain analysis procedures, other crops, insects, and designs for platform dryers and corn cribs.



006

PN-AAJ-814
MF \$2.16/PC \$17.42

The status and challenge of dryland agriculture in developing countries of the tropics and subtropics

Sprague, H.B.
1981, 131p. : En

Increasing production in the dryland areas (areas having annual rainfall of 10-40 inches and dry seasons of 3-10 months) of tropical and subtropical developing countries is critically important in the quest to increase world food production. This paper highlights major approaches for using available technology more effectively toward this end.

Land and soil attributes (e.g. topography and soil capability) that affect dryland agricultural production are described, as are the plant characteristics that permit the most effective uses of limited moisture and provide tolerance to extended periods of dryness. Crop rotations specifically for dryland areas and methods for improving farming systems are included. Among annual crops generally suitable for dryland farming, cereals, food grain legumes, oilseed crops, and fiber crops are most propitious in wet-dry tropical areas; forage crops are best in subhumid tropical areas; drought-resistant crops (pearl millet or grain sorghum) are good in semiarid tropical zones; and for the subtropical temperate Mediterranean zone, wheat, barley, chickpeas, and lentils are best in the cool season while sorghum, millet, beans, and cowpeas are best in the warm season. Included among criteria for acceptable farming systems are opportunities to improve net farm family income; diversity in types of farm/herd enterprises to cushion against losses; availability of labor, resources, and credit; contribution to improved long-range production; and provision of technical assistance.

General requirements to improve dryland agricultural production include: (1) profitable returns for the hard-working farmer; (2) maps that identify land capability categories; (3) rational soil management which appropriately utilizes available resources and properly integrates livestock and cultivation enterprises; (4) a dependable supply of inputs; (5) competent extension officers; (6) field research stations; (7) commercial grades for marketable commodities; and (8) a national education system that emphasizes vocational agriculture and agricultural sciences. A list of botanical names for crop species is appended.

007

PN-AAJ-866
MF \$2.16/PC \$22.75

Agrarian reform in El Salvador

Paarlberg, Don; Cody, P.M.; Ivey, R. J.
Checchi and Company
1981, 172p. : En
AID/SOD/PDC-C-0399

El Salvador cannot achieve an equitable land distribution without reorganizing the land-holding pattern, creating greater income equity, and increasing rural employment and agricultural production. This study analyzes the Government of El Salvador's (GOES) attempt to achieve these ends through a three-phase agrarian reform implemented by the Salvadoran Institute of Agrarian Transformation (ISTA).

Phase I of the reform expropriates estates in excess of 500 ha (compensation is determined by declared land value on 1976-77 tax returns) and redistributes this land to cooperative

agricultural associations. Between 3/80 and 10/81, 326 such farms (223,806 ha or 12.1% of total national farm land) were "intervened" and are now co-managed by ISTA and the cooperatives with GOES army enforcement, where necessary. ISTA is to provide technicians, promoters, and legal and auditing services to the cooperatives, but financial constraints, lack of coordination, and a shortage of trained manpower are complicating this process. Nevertheless, yields on Phase I farms are being maintained and employment, income, and land ownership are increasing.

Phase II, the redistribution of estates between 100-500 ha (343,000 ha or 18.5% of total farm land), and Phase III, the conversion of land under 100 ha (expected to affect 178,000 ha) which is rented or tilled by someone other than the owner into plots of up to 7 ha, are not being implemented. Activation of Phase II has been indefinitely delayed due to financial and managerial burdens on the GOES, the opposition of politically powerful owners of Phase II farms, and the high level of violence in rural areas. No compensation or legal titles have been provided under Phase III, in part due to legal and administrative difficulties and questionable GOES commitment. Finally, full realization of the reform, a process the GOES considers irreversible, is threatened by the high level of violence in the country; the rhetoric and myths surrounding reform from all political factions; the reform's inability to solve all the problems of the rural poor, especially the landless; and the administrative burden and budgetary cost to the GOES.

A 60-item (1971-81) list of references, case studies, and specific recommendations for A.I.D. support of the reform are included.

008

PN-AAJ-871
MF \$1.08/PC \$4.03

The world food problem and BIFAD: the need for production and research

Mellor, J.W.
International Development Cooperation Agency. Board for
International Food and Agricultural Development
BIFAD Occasional Paper, no.2, 1980, 30p. : En

A tight food situation and an accompanying rise in the relative price of food over the next few decades is the global scenario predicted by the Director of the International Food Policy Research Institute (IFPRI) in this 1980 address to the Board for International Food and Agricultural Development (BIFAD). The speech addresses how U.S. foreign assistance policies can help ameliorate food shortages for lower-income populations and countries.

Rising per capita income in developing countries, together with high energy costs and population growth rates, will put great upward pressure on food prices. The high demand for food will result in large imports by countries experiencing accelerated population growth, as agricultural production will be unable to keep pace with demand. The food squeeze and rising prices will severely affect those countries lagging in the development process and low-income groups in all countries.

Individual countries can respond either by increasing agricultural production or by containing demand by choosing narrowly based political systems which prevent the lower 30-60% of the population, whose food needs are not being met, from participating in the political process. Because of the difficulties involved in the former many governments may opt for the latter. In the long run, such a disastrous alternative can only be prevented by research-generated technological



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breakthroughs which intensify production of land already under cultivation. An essential corollary of such a strategy must be to use agricultural advances to generate employment, thus increasing the food-purchasing power of the poor—especially landless laborers, who are the poorest of all. Unfortunately, under the Land Grant Program, the capacity of U.S. agricultural colleges to help build developing country agricultural research institutions for a new green revolution has deteriorated badly since the heyday of the first green revolution in the 1960's. Reactivating this capacity should be a key concern of A.I.D. and BIFAD. Continued involvement with the Consultative Group on International Agricultural Research (CGIAR) to facilitate exchanges between developed and developing countries should be another main concern.

009

PN-AAJ-872

MF \$1.08/PC \$4.03

Crop failure and intercropping in the semi-arid tropics of India

Singh, R.P.

International Crops Research Institute for the Semi-Arid Tropics

ICRISAT Economics Program Progress Report, no.21, 1981, 31p. : En

698039330

AID-698-0393-3-T

Because crop failure is a recurring problem in the semi-arid tropics of India, many farmers take precautions to minimize risk. Intercropping is one such strategy which has been used for centuries. This report examines the incidence and causes of complete (versus partial) crop failure in the agro-climatic regions of India—Akola, Sholapur, and Mahbubnagar—from 1975-76 to 1979-80.

The author posited and proved true through experimentation the hypotheses that crop failure is higher for sole cropping, on larger farms, and on soils with poor moisture retention, and is lower in post-rainy season crop areas.

Specifically, it was found that in Sholapur, where 31% of farmland is intercropped, 11% of crops failed while in Akola, where intercropping prevails (62%), crop failure was 3%. Similarly, because small farmers tend to intentionally intercrop as a hedge against risk, they enjoy less crop failure than do larger farmers. However, when intercropping is practiced, crop failure is much higher for the second crop (9%) than for the first (3%). A detailed discussion of the regional failure rates for intercropping and sole cropping of pearl millet, sorghum, pigeonpea, chickpea, and cash crops is provided. Year to year, crop failure tended to be consistent but did vary somewhat due to changes in rainfall and cropping patterns.

The author proceeded to investigate, using regression analysis, the effect of soil type and moisture and of seasonal cropping and rainfall patterns on crop failure and found that crop failure is reduced by increased irrigation, intercropping, bunding, and post-rainy season cropping. It is recommended that future research emphasize: partial crop failure in intercropping, improved statistical analysis of crop failure, the measurement of objective risk from historical data, and the more complete inclusion of location and time in models of drought stress.

Extensive supporting data is found throughout the text. A list of six references (1974-79) and data on the incidence and extent of crop failure are appended.

010

PN-AAJ-941

MF \$7.56/PC \$81.90

A systems approach to agricultural sector development decision-making: building and institutionalizing an investigative capacity

Rossmiller, G.E.

Michigan State University. Department of Agricultural Economics

1977, 627p. : En

931053600

AID/csd-2975

Complex socioeconomic linkages and interdependencies within and between nations have made planning and policy determinations for agricultural development increasingly difficult. To help solve agricultural sector development problems, computerized models using a broad systems perspective and simulation techniques are required. This four-part report, written for agricultural decisionmakers, policy analysts, and students of systems approach and economic development, explains a simulation approach for policy decisionmaking in agriculture.

An introductory section presents a conceptual model of system simulation in which agricultural decisionmaking is approached from both an investigative side (acquisition, analysis, and synthesis of information) and an administrative side (decision, execution, and responsibility for action). Also presented in this section are discussions of the interaction of agriculture and the national economy, the theory and practice of model-building, the institutionalization of investigative capacity for decisionmakers, and the training of system simulation teams.

The second section addresses the institutionalization of this model within the Ministry of Agriculture and Fisheries in the Republic of Korea, where the original model was developed. A presentation of the physical characteristics, socioeconomic structure, and institutional setting of the Korean agricultural sector is followed by an overview of the values held by Korean decisionmakers, problems encountered, design of the agricultural sector model, and policy areas which the model addressed. Korean population, national economy, technology change, resource allocation, trade, data requirement, and water development projections are also components of the model. Although dependent on the skills of analysts in selecting and linking components and explaining projected responses correctly, the model is seen as a powerful analytical tool.

The third part consists of two Korean sub-sector models for a grain management program and for a government analysis of food grain pricing.

Finally, future directions for the model, including its transferability and the development potential of the simulation approach, are discussed. A total of 52 illustrations, 34 tables, and 185 references (1947-77) are included.



011

PN-AAJ-960

MF \$1.08/PC \$9.10

Postharvest food losses in Sri Lanka

National Research Council. Commission on International Relations. Board on Science and Technology for International Development

(Workshop on Postharvest Food Losses in Sri Lanka, Colombo, LK, 11-16 Feb 1980)

1980, 69p. : En

931122300

AID/ta-C-1433

The reduction of postharvest food losses in Sri Lanka was the topic of discussion at a workshop co-sponsored by the National Science Council of Sri Lanka, the Sri Lanka Foundation Institute, and the National Research Council. This paper summarizes workshop background reports and presents recommendations for reducing losses of grains, perishables, and fish.

Durable food products (e.g., rice, wheat flour, pulses, and coarse grains) account for over 75% of Sri Lanka's domestic food requirements. Occasional import of these foods, particularly wheat flour, seriously drains the country's balance of payments. To achieve grain self-sufficiency, high losses from traditional postharvest handling operations must be minimized. Specifically, those involved in postharvest activities should review procurement and distribution flows; survey postharvest losses and initiate preventive programs; improve the nutritional quality of grains; evaluate the Rice Processing Developing Centre; upgrade training programs to minimize losses; and introduce low-energy-type machinery.

Postharvest losses of perishables often average 15-50% of the fruit and vegetable crop due to rotting, bruising, insects, and rodents. Recommendations include collecting data on postharvest losses; improving handling techniques and reviewing transport systems; providing incentives to upgrade crops; strengthening institutions involved in postharvest losses; and upgrading training programs.

Fish, Sri Lanka's principal source of animal protein, is frequently spoiled due to improper processing, lack of chilling facilities, and rough handling. Deleterious health consequences also result from enzymatic decomposition of fresh fish and contamination of locally cured and imported dried fish due to high moisture levels, unhygienic conditions, and poor storage facilities. Ten recommendations are presented stressing the need for more reliable statistics, increased training in fish technology, better facilities, and improved processing and shipping methods.

012

PN-AAK-020

MF \$2.16/PC \$16.64

The management of food security in the Third World

Nicholson, N.K.

Northern Illinois University. Center for Governmental Studies
1980, 128p. : En

The global food security problem is rooted in the growing number of malnourished people, food price instability, and the lack of domestic organizations capable of dealing with disasters. This paper analyzes the food security problem and developing country needs in food security management and suggests key areas for A.I.D. intervention.

An analysis of the foodgrain prospects in developing countries reveals that increased demand for food grains, precipitated by income and population growth, will exceed both increases in domestic production and available international supplies—leaving developing countries, especially the low-income countries, with unstable grain supplies through the end of the century.

International perceptions of the food security problem (e.g., through the 1974 World Food Conference and the 1980 Brandt Report) and U.S. responses to the international agenda (e.g., through the 1980 Presidential Commission on World Hunger) are reviewed, along with developing country food security policies and programs. It is concluded that, since the international system can be no more effective than the national systems with which it interacts, it is imperative to build on existing domestic capabilities for relief measures, price stabilization, and redistribution which serve complementary and multiple purposes.

Three key management requirements of developing country food security systems are analyzed: information systems (early warning systems and the information needed for food sector planning and for reserves management and distribution systems); market interventions (public procurement and management of stocks and public efforts to improve private trade); and the distribution systems themselves (procedural problems in the administration of disaster relief, buffer stocks and public distribution systems).

The author concludes with an analysis of suitable A.I.D. interventions that may be possible in Latin America (e.g., targeting the poor for distribution programs), Asia (e.g., establishing management systems for parastatals), and Africa (e.g., administering refugee programs), and the role of P.L. 480 grain imports in each of these regions.

013

PN-AAK-049

MF \$2.16/PC \$19.37

Farming systems research: a critical appraisal

Gilbert, E.H.; Norman, D.W.; Winch, F. E.

Michigan State University. Department of Agricultural Economics

MSU Rural Development Paper, no.6, 1980, 147p. : En
931100600

AID/ta-CA-3

It is increasingly evident that public investment in farming system research (FSR) over the last 20 years has been focused on the needs of commercial farmers and professional researchers rather than on the needs of developing country small farmers.

Defining farming systems as human and environmental totalities, the authors of this state-of-the-art study review the literature on FSR, evaluate current FSR programs, and make recommendations to make FSR more responsive to small farmer needs. The political, social, technological, and human components of a farm system are reviewed, and a framework and general description are provided for "downstream" FSR. Unlike "upstream" FSR, which takes place on an institutional level and seeks to generate prototypes to solve deep-seated production constraints, "downstream" FSR is directed at generating, in cooperation with farmers, immediate and site-specific solutions to their needs. Current "upstream" and "downstream" programs at the national (e.g., Columbia, Guatemala, and Senegal) and international levels (e.g., IRR and ICRISAT) are reviewed, as are several issues affecting the programs' content and focus, including institutional mandates, linkages



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among research and implementation agencies, professional and practical credibility, efficiency and accountability of research, and constraints of and criteria for improving FRS approaches. Next, the four stages of FSR methodology are detailed: target area description and diagnosis, project or experiment design, testing or implementation, and evaluation and extension. Problems involved in institutional linkages and in FSR training programs are also covered. General conclusions and three concerns regarding FSR (conflicts of private and public interests, gaining sufficient funding, and time to prove FSR's worth) preface the following recommendations: direct future FSR work toward cost/benefit analyses in different ecological zones; develop methodologies to include livestock and societal, environmental, and distributional impacts; and establish more operational linkages between FSR activities and the entire range of agricultural research, planning, and program implementation.

Appended are descriptions of selected FSR programs and a 155-item bibliography (1902-80).

014

PN-AAK-068

MF \$1.08/PC \$7.93

Food security, self-sufficiency, and economic growth in the Sahelian countries of West Africa; preliminary draft

Stryker, J.D.

Stanford University. Food Research Institute

1978, 61p. : En

698013500

AID/afr-C-1235

Periodic droughts and dependence on emergency food aid have increased the desire of Sahelian countries of West Africa (SCWA) for food self-sufficiency and improved food security. This paper describes SCWA food policies enacted to meet these needs and analyzes the applicability of several suggested strategies.

SCWA food policies have included taxing crop exports to encourage production of food crops, attempting to influence food consumption patterns, and implementing direct investment and input subsidy schemes. SCWA's have also restricted grain imports, leading to increased domestic prices (generally to the benefit of producers at the expense of consumers) and have narrowed the difference between producer and consumer prices. The latter policy has caused severe financial problems for the state marketing agencies and considerable disruption in the private distribution network. Indeed, the most critical failure of SCWA price policies has been that state marketing agencies are undersold by private traders and are unable to buy sufficient domestic grain during gluts to keep the price from falling below officially established levels.

To help SCWA's attain their long-term goals of mitigating the consequences of future emergencies, attaining self-sufficiency in food staples, and accelerating socioeconomic development, the applicability of nine possible courses of action is analyzed: (1) hold foreign exchange for purchasing food in emergency situations; (2) build up emergency reserves to assure self-sufficiency in all circumstances; (3) raise producer prices to increase domestic production and eliminate imports; (4) increase food production to levels that assure exports to other SCWA's in all but the worst years of drought; (5) undertake large-scale irrigation projects to increase food production within the major river basins; (6) promote food and cash crop production on small, rainfed farms; (7) improve transporta-

tion facilities in order to improve food distribution in emergencies; (8) encourage migration to areas capable of supporting more people; and (9) encourage consumption of domestic foods by developing innovative food processing and preparation techniques. A list of data needed by SCWA's to establish an efficient plan of policy combinations is included.

015

PN-AAJ-360

MF \$1.08/PC \$3.77

Development process for improving irrigation water management on farms; executive summary

Skogerboe, G.V.; Lowdermilk, M.K.; Sparling, E. W.;

Hautaluoma, J. E.

Colorado State University. Engineering Research Center
CSU Water Management Technical Report, no.65A, 1980,

27p. : En

Set of 3 manuals: PN-AAJ-361 - PN-AAJ-363

931048900

AID/ta-C-1411

Experience has clearly shown that effective on-farm water management can significantly increase agricultural and labor productivity and improve rural income distribution in developing countries. This report, directed toward project managers and summarizing three separate volumes, describes a comprehensive, interdisciplinary process which relies on farmer and client involvement to improve on-farm management of large-scale irrigation projects. The process entails physical and social scientists: (1) working together with farmers to identify the major constraints to agricultural productivity and resource conservation; (2) developing acceptable solutions to priority problems in collaboration with farmers; and (3) implementing a package of solutions utilizing both government and farmer resources.

These three areas are addressed by the other manuals which comprise this set. The Problem Identification manual describes using reconnaissance findings to design, conduct, analyze, and interpret the results of detailed diagnostic field studies; selecting criteria to rank those problems discovered; and reporting on priority problems and their apparent causes. The Development of Solutions manual outlines a process to generate, screen, and rank plausible solutions; develop a workplan to test these solutions in relation to program objectives, determine the need for more information or work, synthesize the solutions into alternative packages, and report on the outcomes. The Project Implementation manual outlines the areas of project authorization—reviewing the solution package, identifying the project approach, preparing objectives, and obtaining project authorization; project organization—selecting personnel, developing institutional linkages, and specifying project management; and project operation—operationalizing objectives, developing a work plan and time schedule, generating farmer participation, and monitoring progress.

In conclusion, the authors caution that although the manuals are organized separately and appear distinct, they do overlap and are intended to be used together.



Reconnaissance of the existing irrigation system in Minya, Egypt is the crucial initial phase in improving on-farm water management.

016

PN-AAJ-361

MF \$2.16/PC \$13.52

Development process for improving irrigation water management on farms: development of solutions manual

Sparling, E.W.; Hautaluoma, J.E.; Lowdermilk, M. K.; Skogerboe, G. V.; Stewart, W. G.; Kemper, W. D. Colorado State University. Engineering Research Center *Water Management Technical Report, no.65C*, 1980, 102p. : En

Set of 3 manuals: PN-AAJ-361 - PN-AAJ-363; Executive summary: PN-AAJ-360

931048900

AID/ta-C-1411

Experience has clearly shown that effective on-farm water management and control can significantly increase agricultural productivity and improve rural income distribution in developing countries. This volume, one of a four-volume series, describes a comprehensive process for improving on-farm irrigation water management in developing countries.

The Development of Solutions manual focuses on the identification and evaluation of alternative designs for water management systems and presents three subphases: (1) identification and ranking of plausible alternatives; (2) detailed

development of solutions to priority problems; and (3) assessment, refinement, and assembling of the solutions.

A "brainstorming session", in which all participants are encouraged to submit ideas with no threat of judgement, is recommended as a first step in the development of solutions process. Plausible solutions are then classified according to such criteria as the need for multi-discipline involvement, time and resource requirements, technical and economic viability, and complementarities with other solutions. Preparation of a solution/criteria matrix providing information on the appropriateness of each plausible solution is suggested. When sufficient information is available, the project participants should meet to design combinations or "packages" of solutions for the particular problem(s) encountered. The packages are then evaluated and refined in field trials. When the field tests are finished, the solutions are given a final assessment for technical adequacy, farmer acceptance, farmer participation, economic adequacy, social and political feasibility, and organizational adequacy. The final step is to prepare the packages for widespread dissemination and formal reporting to the appropriate agencies.

An explanation of the use of linear programming for crop selection and water pricing is appended.



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017

PN-AAJ-362

MF \$2.16/PC \$15.47

Development process for improving irrigation water management on farms: implementation manual

Hautaluoma, J.E.; Freeman, D.M.; Kemper, W. D.; Layton, J. J.; Lowdermilk, M. K.; Radosevich, G. E.; Skogerboe, G. V.; Sparling, E. W.; Stewart, W. G.

Colorado State University. Engineering Research Center
CSU Water Management Technical Report, no.65D, 1980,
117p. : En

Set of 3 manuals: PN-AAJ-361 - PN-AAJ-363; Executive
summary: PN-AAJ-360

931048900

AID/ta-C-1411

Experience has clearly shown that effective on-farm water management and control can significantly increase agricultural productivity and improve rural income distribution in developing countries. This volume, part of a four-volume series describing a comprehensive system for improving on-farm irrigation water management in developing countries, outlines a process for proposing and obtaining authorization of a project, establishing the project organization, and executing the project to meet its objectives.

After reviewing and choosing from among previously identified and feasible solutions, the planner must conceptualize a set of objectives. This accomplished, a sound proposal must be prepared. It should describe a favorable impact on problems; contain new ideas and a review of current literature; be clear, concise, and complete; detail all planned operations; spell out the rights, duties, and responsibilities of all participants—sponsors, farmers, and project staff; and be realistically budgeted. After authorization, the focus shifts to developing a strong project organization. This entails choosing an organizational design; selecting primary personnel—project manager, technical field leaders, and support staff; selecting and training on-line personnel—agronomists, engineers, and social scientists; refining objectives; establishing ties with farmer associations, the agribusiness community, the Ministry of Agriculture, national and international banks, etc.; and specifying project management (i.e., participative vs. authoritative). Operating the project to ensure objectives are met involves establishing a work plan and schedule of events, initiating field operations, establishing field technical support, training farmers, monitoring and evaluating progress, refining the project, and ultimately transferring responsibility for the project to local participants. In addition, long-run project success depends upon adequate farmer participation to ensure that project innovations are integrated into the local agricultural system.

A 13-item bibliography (1958-80) is appended.

018

PN-AAJ-363

MF \$3.24/PC \$26.39

Development process for improving irrigation water management on farms: problem identification manual

Lowdermilk, M.K.; Franklin, W.T.; Layton, J. J.; Radosevich, Skogerboe, G. V.; Sparling, E. W.; Stewart, W. G.

Colorado State University. Engineering Research Center
CSU Water Management Technical Report, no.65B, 1980,
201p. : En

Set of 3 manuals: PN-AAJ-361 - PN-AAJ-363; Executive
summary: PN-AAJ-360

931048900

AID/ta-C-1411

Experience has clearly shown that effective on-farm water management and control can significantly increase agricultural productivity and improve rural income distribution in developing countries. This volume, one of a series on a comprehensive process for improving on-farm irrigation water management in developing countries, offers guidelines, concepts, procedures, and methods for identifying factors which inhibit efficient functioning of farm irrigation systems.

Problem identification has as its goals: understanding the traditional farming system and its interrelated components; identifying constraints to production, especially on small farms; and providing data which can be used in designing projects for upcoming growing seasons. The authors emphasize the importance of employing an interdisciplinary research team of engineers, sociologists, economists, and agronomists and encouraging active farmer participation. Major problem identification activities can be divided between reconnaissance and diagnosis. The former includes: (1) developing a general overview of the farm irrigation system—summarizing available research, meeting with officials from relevant institutions, and conducting informal interviews with selected farmers; (2) organizing and implementing initial field visits; (3) compiling a preliminary list of problems; and (4) refining program objectives. The latter comprises: (1) designing and conducting diagnostic field studies of the plant environment (crops, cropping patterns, and soils); farm management practices (irrigation, cropping, and budgeting practices); water supply and removal (the command area and the source, availability and quality of irrigation water); and institutional linkages between the irrigation system, agricultural infrastructure, and the sociocultural network; (2) analyzing and interpreting findings; (3) selecting criteria for ranking problems in relation to program objectives; and (4) reporting findings regarding priority problems and their apparent causes.

A 56-item bibliography (1954-79), data management and budget analysis forms, and a list of equipment needs are appended.

019

PN-AAJ-925

MF \$1.08/PC \$4.55

Issues in irrigation planning and development

Easter, K.W.

Minnesota University. Department of Agricultural and Applied
Economics

Staff Paper, no.P80-5, 1980, 35p. : En
298003500

AID/ne-C-1507



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Of the numerous irrigation planning and development issues facing developing countries, four are addressed in this report: (1) water allocation methods; (2) irrigation project implementation and rehabilitation; (3) alternatives for design, scale, and distribution of irrigation investments; and (4) improving system-wide performance.

Proper water allocation methods are vital to prevent loss of water while in transit from the source (i.e., reservoir, river, or well) to individual farms. Seasonal water flows, user location vis-a-vis water source (i.e., up or down river), frequency of supply, size of the area to be served, and equity and efficiency in farm-level allocation are important allocation issues for which research is needed. Feasibility studies are required to determine which of the following allocation methods are appropriate for specific projects: (1) unrestricted use for which no formal allocation procedure exists; (2) prescribed shares of water available for specific time periods; (3) unrestricted use in order of location along the irrigation canal; (4) priority use according to the date of farm settlement and/or economic crop value; and (5) consumptive use according to the highest price bid.

In project implementation, a country's institutional and managerial arrangements must be assessed to assure efficiency and equity in irrigation system operation. There are three such institutional types to consider: those that determine the distribution of benefits (local water bureau); those that deal with water distribution and maintenance (water user's association); and those that make relevant national policies (Ministry of Agriculture).

As to irrigation policy alternatives, small-scale projects (i.e. tank irrigation) appear desirable but more information is needed to determine their viability, performance, and operation in the field. To improve system-wide performance, more research is needed on the joint operation of surface and groundwater supplies to ensure optimum use of available water sources, the management of irrigation systems which draw from the same groundwater source, and the effects of certain government policies on the rate at which ground water is drawn. Appended is a 24-item bibliography (1963-78).

020 **PN-AAK-070**

MF \$2.16/PC \$14.30

Mathematical development and verification of a finite element aquifer flow model, AQUIFEM-1

Wilson, J.L.; Townley, L.R.; Parsons, R. M.
Massachusetts Institute of Technology. Technology
Adaptation Program
1979, 115p. : En
263000013
AID/ne-C-1291

Complex geometry and conditions inherent in natural aquifers make it difficult to obtain exact solutions for the equations contained in current mathematical models that represent groundwater flow under diverse conditions. This report describes the development and verification of a simple and inexpensive two-dimensional (2D) finite element model for groundwater flow. Based on the hydraulic equations of essentially horizontal flow, the model is called AQUIFEM-1 (Aquifer Finite Element Model-1 Layer) and is able to account for leakage from an adjacent aquifer, pumping and recharge wells, lateral inflows and outflows, induced infiltration, and numerous other boundary conditions.

Model formulation is presented in three steps. First, the governing equation for 2D horizontal groundwater flow in an aquifer is developed along with the assumptions behind its derivation and appropriate boundary conditions. Most of the model's capabilities are relatively straightforward applications of the finite element method to the equations for these conditions, subject to time-varying parameters. Second, formulation of the finite element employs the Galerkin method because of its symmetry and positive definiteness properties. Third, triangular elements and linear interpolation techniques are used to solve the system of equations.

The model is verified by a comparison to various steady state and transient analytical solutions, such as one-dimensional (1D) steady flow in confined leaky and non-leaky aquifers and in a phreatic aquifer; 1D transient flow in confined and phreatic aquifers; and 2D radial flow to a well in a leaky and non-leaky confined aquifer. Compared to the finite difference technique, AQUIFEM-1: (1) describes irregular boundaries better and without the need for special formulas; (2) makes it easier to use an irregular grid to provide different levels of spatial discretization in different regions of the aquifer; (3) handles aquifer non-homogeneity and anisotropy easily; and (4) sometimes requires fewer node points to represent the aquifer to the same level of accuracy, resulting in savings of computational time and computer storage.

Appended are a 33-item reference list (1959-80) and a list of symbols.

021 **PN-AAJ-717**

MF \$4.32/PC \$39.26

An economic evaluation of the trypanosomiasis problem in Zone One

Shaw, A.P.M.; Kamate, Cheick
Chemorics International. Consulting Division
1981, 295p. : En
688020500
AID/SOD/PDC-C-0220

Trypanosomiasis (sleeping sickness) is one of the major constraints to livestock development in Mali. This report projects, against a background of topographical, climatic, demographic, and agricultural information, the impact of trypanosomiasis over the next 20 years on cattle in a portion of southwest Mali along the Niger river designated as Zone 1 by the New Lands Activity (NLA)—the Malian agency responsible for tsetse research.

The value of cattle lost to trypanosomiasis over the the next two decades is projected to be between MF 392,933,000 and MF 577,367,000, with an average loss per infected animal of about MF 19,500. Using these figures, the report provides a benefit-cost analysis of various strategies to combat the disease. Overall, it is clear that the costs are high relative to the benefits to be expected. Only one strategy, systematic treatment plus diagnostic support, provides a positive net value at both high and low benefit levels. Prophylaxis of work oxen and treatment of other cattle—which approximates current policy—could prove economically feasible if fully implemented. No other strategies proved profitable. In particular, two strategies—eradication of tsetse populations with cleared barriers and wet season prophylaxis for all cattle—can definitely be rejected. Eradication at a reduced cost remains possible but more information is needed on the cost of barriers to protect Zone 1.



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Recommendations call for the NLA to: inform the Livestock Service of the results of this report; equip the Kati field station with diagnostic equipment; conduct a study in an area where trypanosomiasis is a serious threat to production and contrast the results with those of this study; further examine the merits of Ndama, Mere, and Zebu cattle; conduct research into the course of trypanosomiasis among cattle in the field or at field stations to gather reliable morbidity and mortality statistics; and further investigate wet and dry season grazing patterns and the effect on these of tsetse clearance. A 20-item bibliography (1948-80) is appended.

022

PN-AAJ-718

MF \$2.16/PC \$20.02

The status of bovine trypanosomiasis and seasonal variation in its occurrence in Zone 1 (Niger Valley) of the Republic of Mali

Awan, M.A.Q.; Maiga, S.; Bouare, S.; Telly, A.
Chemonics International. Consulting Division
1981, 114p. : En
688020500
AID/SOD/PDC-C-0220

Trypanosomiasis (sleeping sickness), inflicted by the prolific tsetse fly, is a major constraint to the development of the cattle industry in Mali. This report, responding to the paucity of scientific evidence on the extent of tsetse infestation, investigates the tsetse presence in 110 villages in Zone 1, a portion of southwest Mali along the Niger River. Three types of diagnostic examination were used—thick blood smears, thin blood smears, and lymph node biopsy smears, with the latter found to have the most diagnostic utility. Factors limiting the experiment's success were the presence of trypanosome-resistant cattle and the widespread use of trypanocides by farmers.

The experiment's results were as follows: of the 7,300 cattle examined, 307 were trypanosomiasitic, with 5.36% incidence in the rainy season as opposed to 3.11% in the dry; bovine trypanosomiasis is endemic in the northwestern sector; nomadic herds of cattle had a higher per herd incidence of infection (37.5%) than did sedentary herds (24.7%); the breed of cattle most susceptible was the Zebu, followed by the Mere, and then the Ndama; calves under 6 months were found to be more resistant to infection than adults over 3 years old; the most prevalent trypanosome was *T. vivax* (82% of cases in the rainy season, 64% dry season), followed by *T. congolense* and *T. brucei*; it was not possible to gather verifiable data on bovine morbidity or mortality because Malian statistics on cattle do not include cause of death. Besides cattle, sheep, goats, donkeys, and horses were examined and found to be minimally infected except for donkeys whose infection rate was 6.6%.

It is recommended that: trypanosomiasis experiments, employing at least two field teams, be extended to all tsetse infested areas of Mali to test 20,000 cattle per year (facilities to conduct this project are detailed in an appendix); existing laboratory staff be increased; the use of trypanocides be restricted to avoid the evolution of trypanocide-resistant strains; two suggested drug regimens be implemented; a trypanosome research and diagnostic unit (facilities and staff are detailed) be established; and research be extended to human trypanosomiasis.

Appendices include a 38-item bibliography (1888-1979) and nine bilingual (English and French) survey maps.

023

PN-AAJ-719

MF \$2.16/PC \$24.83

Report on development alternatives in the Dilly Pastoral Zone

Griffin, Thomas; Shaw, A.P.M.; Topik, J. H.; Wilkes, Kay;
Miller, S. L.; Shapiro, Paul
Chemonics International. Consulting Division
1981, 143p. : En
688020500
AID/SOD/PDC-C-0220

The ecological problems of the Sahel are among the major limiting factors to expanding livestock production in Mali. To aid in reducing these limitations, this study reports on livestock production, constraints to production, feasibility of development alternatives, topographical and climatic characteristics, and grazing patterns in Mali's Dilly Pastoral Zone (DPZ).

Although inadequate and unreliable data and the lack of a qualified sociologist, animal husbandry expert, and full-time economist marred the effectiveness of the report, three major constraints to livestock production in the DPZ were found: fire (1/3 of the DPZ, representing 200,000 tons of forage, burned during the 1979-80 grazing season); poor range conditions (e.g., burned land susceptible to erosion and desertification, overgrazing around permanent water supplies, and imbalance of forage between rainy and dry seasons); and water deficiencies (90% of the DPZ has water during the rainy season, but only 25% has water during the dry season).

The first development alternative, maximum investment in the DPZ, includes fire control, water development, and range management, and is judged as too costly. The second, to develop only one of the maximum investment components, seems impractical because complete DPZ development requires development of all the components. The last alternative, to concentrate livestock development efforts on the Test Perimeter (a small pilot area within the DPZ), was selected as the most cost-effective alternative because all maximum investment components can be perfected there and implemented throughout the DPZ as funding permits.

Recommendations include: establish a three-person core staff for the pilot area supplemented by research and technical specialists equivalent to 3 person-years; build facilities to house, transport, and properly equip expatriate advisors; secure frequent radio contact and energy supplies from the rear base in Bamako; and adopt the original management plan for the Test Perimeter making it the center for training and extension activities in livestock management.

Appended are a 14-item bibliography (1974-80) and maps detailing proposed management units and recently drilled wells in the DPZ, underutilized areas and water resources in the DPZ, the extent of water development in the Test Perimeter, and location of the DPZ and Test Perimeter.

024

PN-AAK-050

MF \$2.16/PC \$16.51

The water buffalo: new prospects for an underutilized animal

National Research Council. Commission on International Relations. Board on Science and Technology for International Development
1981, vii, 116p. : En
931001155
AID/DSAN-G-0130



Despite negative misconceptions about the water buffalo, a series of empirical observations indicate that this animal is an untapped resource both as food and as a beast of burden in tropical, subtropical, and warm temperature zones throughout the world. This report compares water buffaloes to cattle in terms of the former's health, nutrition, environmental impact, reproduction, management, and use as a source of food and animal traction, and then identifies priorities for buffalo research.

The two general types of domesticated water buffalo—the Swamp buffalo with swept-back horns found from the Philippines to as far west as India and the River buffalo with curled horns found farther west, from India to Egypt and Europe—total at least 130 million, one-ninth of the number of cattle in the world. Swamp buffaloes, while primarily employed as work animals, can also be used for meat, but are almost never used for milk production. River buffaloes, in contrast, are reserved primarily for dairy purposes. Contrary to popular belief, while inordinately strong and well-adapted to hauling in deep mud, these bovine creatures are sociable, gentle, and serene. In addition, although they cannot work continuously in direct sunlight (time is required for watering) or tolerate arid climates, water buffaloes are not exclusively tropical animals, being perfectly adapted to the climates of Italy and the Ukraine. As to the quality of their meat and milk, water buffaloes' digestive systems can extract nourishment from coarse forage (on which cattle grow thin), producing lean steaks and milk rich enough for the manufacture of mozzarella cheese. However, cattle are easier to herd, grow faster under intensive feeding conditions, and offer less breeding problems than do buffaloes.

To explore the potential uses of the water buffalo in developing countries, additional research is needed on comparisons with cattle in nutrition, breeding, and performance; specimen preservation and genetic improvement; buffalo meat and milk consumption; production in new and unfamiliar areas; digestive capacity and proper nutrition; management practices for small farmers; and reproduction.

Lists of related readings are provided for each chapter and a sketch on water buffaloes in Africa is appended.

025

PN-AAK-127

MF \$2.16/PC \$14.95

An assessment of animal traction in Francophone West Africa

Sargent, M.W.; Lichte, J.A.; Mton, P. J.; Bloom, Roger
Michigan State University. Department of Agricultural
Economics

MSU African Rural Economy Program Working Paper, no.34,
1981, 114p. : En
AID/REDSO/WA-78-144

The increased use of draft animals to provide power for tillage operations, manure to improve soil fertility, and meat for selling is expected to enhance small farm production and income in Francophone West Africa.

Against a background discussion of the history and potential benefits of animal traction in the region, this report analyzes the effectiveness of draft animal technology (DAT) in improving the lot of small farmers by reviewing available literature and assessing 27 West African DAT projects. The results show the benefits to farmers to be sporadic and often falling well below expectations due partly to unrealistic estimates, but mostly to a lack of improved crop management strategies to complement DAT (i.e., soil conservation, crop rotation, and proper weeding

techniques); a series of farm-level constraints (i.e., unavailability of land for farm expansion, onerous financial risks for farmers, and competing demands for labor); and a lack of adequate support services (i.e., production inputs, marketing, credit, veterinary services, and training).

To improve the effectiveness of future DAT projects in West Africa, the authors make the following recommendations. (1) More applied research should be conducted to field test prototype technologies. (2) The tradeoffs between the use of oxen, donkeys, and horses and the choice of plowing versus minimum tillage should be considered. Animal-drawn weeding and the use of inexpensive weeding equipment like the ground-nut lifter is encouraged. (3) Farmers' investment risks should be minimized by clarifying loan obligations, insuring animals and equipment, maintaining support systems, and establishing farm-size thresholds for loan repayment schedules. (4) A balanced cropping system should be implemented which reflects short-run needs for cash, food, and animal maintenance and long-term considerations of soil improvement and continuous land use. (5) Pilot projects should be implemented wherein farmers adopt new techniques sequentially rather than all at once. (6) Project activities should be systematically monitored and their impacts evaluated. (7) Research should be conducted on improved biochemical technology to support the mechanical aspects of DAT's in increasing crop production.

Appended are an inventory of the DAT projects reviewed and a 83-item bibliography (1961-80) in French and English.

026

PN-AAK-776

MF \$3.24/PC \$27.95

Studies on feeds and feeding of livestock and poultry, feed composition, data documentation and feeding systems

Kearl, L.C.; Harris, L.E.

International Feedstuffs Institute

(International Workshop on Feeds and Feeding of Livestock
and Poultry, Feed Composition, Data Documentation, and
Feeding Systems, Manila, PH, 22-24 Jan 1980)

1980, : En
931048900

AID/ta-C-1159

Developing countries in Southeast Asia are attempting to expand their livestock resources. To assist in this effort, a workshop on animal feeds and feeding was held in 1980 in Manila, Philippines for researchers, government officials, and feed industry representatives from Iran, the Philippines, Hong Kong, Thailand, Malaysia, Indonesia, Sri Lanka, and Singapore. This report presents the proceedings and recommendations of the workshop.

Provided are U.N. Food and Agriculture Organization (FAO) Animal Production and Health Commission for Asia, Far East, and Southwest Pacific Region (APHCA) plenary reports, country papers, International Network of Feed Information Centers (INFIC) System papers, general papers, and special reports on: (1) the current situation and medium-term outlook for feedstuffs in Asia and the Far East; (2) FAO feed development programs; (3) regional and country-specific analyses of beef cattle, water buffalo, poultry, sheep, goat, swine, and dairy animal production, including major constraints; (4) A.I.D.'s support of animal production; (5) national governments' regulations of and assistance in the areas of feed production, credit, quality control, supply sources, and extension services; (6) mineral deficiencies and toxicities of grazing ruminants; and (7) the history and



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The water buffalo...contrary to popular belief, this inordinately strong bovine creature is sociable, gentle, and serene.

organization of INFIC, its feed vocabulary, and its need for a Southeast Asian data base.

Recommendations of the workshop are to: inventory feeds available in each country and base animal production accordingly; document information on nonconventional feed resources; adopt INFIC's feed vocabulary and feed assessment procedures; increase research on feeds, feeding systems, and nutrient requirements appropriate to each species of livestock; increase communication among feed researchers; adopt standard methods of feed analysis; implement quality control measures and policies for producing and utilizing feed resources; train people in feed analysis and quality control; and organize an APHCA Consultation to promote regional cooperation in feed and livestock production and to establish action-oriented programs.

027

PN-AAJ-520

MF \$3.24/PC \$26.13

Cross-inoculation patterns of legumes and isolates of rhizobium, v.1

Alexander, M.; Lieberman, M.T.
Cornell University. Department of Agronomy
1981, 200p. : En
Volume 2: PN-AAJ-521
AID/csd-2834

To help agricultural researchers predict the likelihood that rhizobia in a given soil will nodulate a newly-introduced legume, a two-volume state-of-the-art document summarizing extensive published information on the ability of *Rhizobium* strains to nodulate legumes has been prepared.

The first volume presents a 79-item list of publications (1914-79)—mostly in English, but with one entry each in Portugese, French, and Japanese—on successful and unsuccessful cross-infection trials, together with 81 tables on the successful trials and an overview of both volumes. Volume II consists solely of 71 tables of unsuccessful cross-infection



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trials. In both volumes the tables are arranged alphabetically by plant genus; species are indicated within each table. The authors note that synonyms exist for many of these genera and species and welcome suggestions on taxonomy. Superscripts identify the direction in which the cross-infection experiment was conducted (which was the *Rhizobium* source and which was the host legume). No distinction is made as to whether the infections are effective or ineffective in nitrogen fixation. In many cases, the same *Rhizobium*-legume pair appears in both the positive and the negative tables because different studies produced different results. This is not unusual, since tests with different rhizobia from nodules of the same plant species very seldom yield constantly positive results.

Although much has been published, the data are still too sparse to make generalizations or to establish a new *Rhizobium* classification scheme due to the large number of possible cross-inoculation experiments when dealing with 700 genera (and over 10,000 species) of legumes. The lack of consistency in experimental conditions and reporting of results further complicates meaningful analysis. However, the affinities indicated may help to suggest which affinities should be evaluated in future attempts to establish a better categorization scheme.

A master chart showing the results for the over 120 genera that have been tested was prepared, but the data were too scattered to reveal any general patterns despite visual data examination. A computer analysis of the data will be made to see if affinities exist; results of this analysis will be published.

028

PN-AAJ-688

MF \$1.08/PC \$10.79

Agricultural development: present and potential role of edible wild plants; Part I: Central and South America and the Caribbean

Grivetti, L.E.
University of California, Davis
1980, 82p. : En

Part II, Sub-Saharan Africa: PN-AAJ-689; Part III, India, East Asia, Southeast Asia, Oceania: PN-AAJ-691
AID/otr-147-80-87

This three-volume, AID-sponsored study on the feasibility of using edible wild plants for food in developing country tropical areas assesses the potential role of edible wild plants in Central and South America and the Caribbean (Volume I), Sub-Saharan Africa (Volume II), and India, Oceania, East and Southeast Asia (Volume III). Based on a search of available literature published in the last 150 years, the report documents dietary uses for wild plants, identifies the nutritional importance of selected species, and examines the potential for research and development (R&D) of such species, in particular for R&D aimed at meeting developing country nutritional needs. Botanical and dietary data on edible wild plants are presented on a country by country basis.

Four conclusions are drawn to support further research on edible wild plants: (1) Despite vast information on dietary uses of wild plants, no regions of the world have been thoroughly examined for the potential existence of highly nutritious wild plants. (2) Wild plants, unlike most domestic field crops, are climatically adapted to variable conditions, making them important sources of nutrients during times of drought. (3) Few data are available on the nutritional composition of most edible wild plants. (4) Potential economic uses for wild plants include fiber, oil, dye, and drugs/medicine.

Accordingly, the following four recommendations are made: (1) Underutilized or unexploited wild plants should be considered a research priority within A.I.D. agricultural development programs. (2) USAID officials should receive limited discretionary funding (U.S. \$20-30,000) to survey target regions for wild plants with potential dietary and non-dietary uses. (3) Teams of qualified anthropologists, geographers, botanists, and nutritionists should be encouraged to apply for such funds. (4) A systematic effort should be launched to develop a nutritional data base on the energy, vitamin, and mineral composition of important edible wild plants. Extensive bibliographies are appended to each volume.

029

PN-AAJ-876

MF \$2.16/PC \$17.68

Sources of resistance to selected fungal, bacterial, viral and nematode diseases of soybeans

Tisselli, O.; Sinclair, J.B.; Hymowitz, T.
Illinois University. College of Agriculture
INTSOY series, no.18, 1980, 134p. : En
931056011
AID/ta-C-1294

Soybean breeders and plant pathologists often have difficulty finding sources of resistance to soybean pathogens because the relevant information is scattered in many publications with a limited circulation. This publication provides an organized reference of soybean diseases for professionals concerned with this problem. Of over 100 soybean pathogens known to exist, only 35 are of economic importance. This report considers 19 diseases, of which 11 are caused by fungi, 4 by viruses, and 2 each by nematodes and bacteria. A description of the pathogens, their symptoms, and photographs of infected plants are provided.

Fungal diseases discussed are: two defoliants, Brown Spot and Brown Stem Rot (BSR 301 and 302 cultivars are resistant to the latter); Downy Mildew, which causes yield losses of up to 8%; Frogeye Leaf Spot which causes yield losses as high as 15%; *Phytophthora* Root and Stem Rot to which young plants are particularly susceptible (most of the soybean germplasm collections have been screened against 4 of its 16 races); Purple Seed Stain which reduces seed germination (a number of cultivars are reported resistant); *Pythium* Root Rot, *Sclerotinia* Stem Rot, and *Sclerotium* Blight, which are of minor importance (experiments on *Sclerotium* yielded 37 accessions that showed resistance); Soybean Rust and Diaporthe Stem Canker which both cause yield losses up to 50% (resistant cultivars do not show high resistance to the latter).

Bacterial Blight and Bacterial Pustules are defoliants; the cultivar CNS is resistant to the latter.

Viral diseases are: Soybean Mosaic, causing yield losses up to 25% (numerous resistant accessions have been found); Bean Yellow Mosaic, not yet investigated (4 cultivars and one Plant Introduction are resistant); Cowpea Chlorotic Mottle, of minor importance (a number of cultivars are resistant); and Peanut Mottle (11 cultivars resistant). Root-Knot Nematode causes yield losses of up to 90% (a table of cultivars resistant to *Meloidogyne* spp., a main causal agent of the disease, is provided) while the use of resistant cultivars has been highly successful in reducing losses due to the Soybean Cyst Nematode.

A list of references is appended to each disease report.



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030

PN-AAJ-880

MF \$3.24/PC \$37.96

Proceedings of the international workshop on chickpea improvement

International Crops Research Institute for the Semi-Arid Tropics

(International Workshop on Chickpea Improvement, Hyderabad, IN, 28 Feb-2 Mar 1979)

1980, 303p. : En

New approaches to breeding of chickpeas (CP's) require increased cooperation between national and international breeding programs. In 1979, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) sponsored an international seminar at Hyderabad, India to review ICRISAT's research on CP improvement and to discuss the merits of new breeding techniques. Topics discussed at the seminar, whose proceedings are presented in this report, were: breeding strategies; yield improvement through Kabuli-Desi introgression; CP agronomy, physiology, and microbiology; and breeding at the national level.

Four working groups gave recommendations for future action. Among the recommendations of the Breeding Group were that: screening against *Ascochyta* blight and cooperative screening of selected advanced lines be intensified internationally; Kabuli-Desi introgression be continued; verifiable data be gathered on the efficiency of various breeding methods; all CP experiments be reported to ICRISAT; and CP hybridization be studied. The Genetic Resources Group recommended that: seed samples be fumigated and treated with Benlate T for international dispatch (if funds are lacking, a special request should be made); training courses be given where needed; evaluations be increased; CP germplasm maintenance be the duty of ICRISAT and national governments. Among the Plant Protection Group's recommendations were that ICRISAT: fund regional CP seminars and facilitate uniform methods for determining races of *Fusarium* wilt and for CP disease screening. Among the experiments recommended by the Plant Growth Group were: a factorial investigation of the effects of temperature and moisture content on seeds; a determination of whether agronomic treatment or breeding resistant strains best fights moisture stress; a determination of the environmental and genotypic constraints on root development; and a study of CP drought tolerance.

Twelve country reports on CP production and research are included and each paper or section is accompanied by a list of references. A list of seminar participants is provided.

031

PN-AAJ-942

MF \$1.08/PC \$52

Effects of calcium, manganese, and aluminum on growth of rhizobia in acid media

Keyser, H.H.; Munns, D.N.

University of California, Davis. Department of Land, Air, and Water Resources

Soil Science Society of America Journal, v.43(3), 1979, 500-503p. : En

931061300

AID/ta-C-1207

Studies were conducted in defined liquid media to assess the effects of manganese (Mn) and aluminum (Al) toxicity and calcium (Ca) deficiency, associated with soil acidity, on the growth and development of various rhizobia strains and to

compare these effects with those caused by low phosphorus (P). The study included 23 strains of cowpea rhizobia capable of growth at pH 4.5 and 10 strains of *Rhizobium japonicum* capable of growth at pH 4.8. The low level of Ca represented the extreme low range in acid test solutions and the high level of Mn represented the upper or toxic range. The results of these studies are presented in this paper.

In a detailed growth study of three cowpea strains at pH 4.6, low P limited maximum population density in all three strains while low Ca limited it in only one. A rapid screening method applied to cowpea rhizobia at pH 4.5 and to soybean rhizobia at pH 4.8 indicated that high Mn and low Ca slowed growth of some strains, but that Mn stopped growth of none and low Ca stopped growth of only three strains. Neither was as severe a stress on growth as moderate amounts of Al, simultaneously observed. For a few strains, however, the most negative effect on growth was found when low Ca and high Mn accompanied Al, a possible combination in acid soils. All strains tolerant of Al were also tolerant of Mn and low Ca.

Possible amelioration of Al toxicity by Ca was tested in three cowpea strains by a factorial experiment with three Ca levels and four Al levels at pH 4.5 in liquid media. The results showed that Ca has a statistically significant protective effect against Al in two strains but that biologically the effects were small and insignificant.

The authors conclude that in acid soils, Al toxicity and acidity itself are probably more demonstrable constraints to rhizobial growth than Mn toxicity and Ca deficiency. Appended is a 17-item bibliography (1954-79).

032

PN-AAJ-943

MF \$1.08/PC \$52

Acid tolerance of rhizobia in culture and in symbiosis with cowpea

Keyser, H.H.; Munns, D.N.; Hohenberg, J. S.

University of California, Davis. Department of Land, Air, and Water Resources

Soil Science Society of America Journal, v.43(5), 1979, 4p. : En

931061300

AID/ta-C-1207

While rhizobial strains are known to differ in their ability to grow in acid soils and culture media, the more important differences are in symbiotic acid tolerance, (SAT) i.e., the ability to sustain the growth of the dinitrogen-dependent host plant despite acid-related stress in the soil. This paper describes two greenhouse screenings of 21 strains of slow-growing rhizobia for SAT with three species of cowpea in two ultisol subsoil samples adjusted to pH 4.6 and 6.0-6.2 in order to test a rapid laboratory method of prescreening rhizobia for SAT which could reduce the number of strains going through more cumbersome greenhouse screening.

Plant growth without nitrogen (N) fertilizer depended on effective nodulation. In both trials, plants became yellow one week after emergence. Plants with N fertilizer or effective inoculants became green again at the second trifoliolate leaf stage. Without N fertilizer, sparsely nodulated plants grew little beyond this stage, remained yellow, and had less than 2% N and 5-7 mg N per plant shoot. With highly effective nodulation, shoot N content was 120-140 mg/plant for BE5 and TVu1190, and 45 to 50 mg/plant for TVu4557. Acidity had little effect on growth of N-fertilized plants, but reduced growth and nodulation of symbiotically-dependent plants to a degree depending



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markedly on rhizobia strain and somewhat on soil type and host variety. At the favorable pH level of 6.0-6.2, all rhizobia produced abundant nodulation and were effective on TVu4557 and 1190. However, uncertainties on the latter point exist because the test soil proved to contain rhizobia that nodulated significantly in the uninoculated controls at the favorable pH.

In general, the data confirm that cowpea rhizobia contain a large and perhaps continuous variation in SAT. Some strains (174, 209, 420, and 425) combined tolerance with effectiveness, while others (68, 207, and 1024) proved highly acid-sensitive on both species and on both soils.

Laboratory pre-screening, based on rhizobial ability to grow in acid media containing Al, would have successfully eliminated approximately 65% of the strains that proved symbiotically acid-sensitive in soil, while erroneously eliminating only one SAT strain. A 9-item reference list (1968-79) is appended.

033

PN-AAJ-944

MF \$2.16/PC \$18.85

Leucaena leucocephala: a tree that "defies the woodcutter"

U.S. Agency for International Development. Bureau for Development Support. Office of Agriculture
1981, 145p. : En

Leucaena leucocephala, a long-ignored, versatile legume native to Central America, could offer solutions to global ecological problems of denudation, soil erosion, dwindling wood supplies, and crop production. This report documents the potential importance of many *Leucaena* varieties for wood, forage, fertilizer, and ground cover in tropical and subtropical countries.

As a wood crop, some giant varieties grow to 20 meters in height within 5 years while common varieties yield a high volume of wood (130 cu m/ha in 3 years). Wood yield is used for furniture, heating (16,000 BTU's per kg.), paper, and low-cost housing materials; and yields 20 metric tons of dry matter/ha per year when coppiced. *Leucaena* is also an excellent forage crop for livestock, with a nutritive value and digestibility equal to that of alfalfa while being more adaptable than alfalfa (due to its ability to grow on rugged rocky slopes and withstand droughts and high altitudes), leaving the best land available for crops for human consumption to cattle, hens, fish, pigs, and goats. *Leucaena* has significantly aided weight gain and provided high levels of protein and carotene. The presence of mimosine, a toxic alkaloid, is *Leucaena*'s main fault as thyroid problems may develop if animals are fed a continuous ration for a prolonged period. People also use *Leucaena*'s flowers, leaves, and seeds for salads, soups, and vegetables. This legume, whether applied as green manure, used as a shade tree, or intercropped, efficiently recycles nutrients and builds soil fertility. One ha *Leucaena* harvested over one year provided the fertilizer equivalent of an estimated 500 kg of nitrogen while turning phosphorous and potassium into a more usable form. Its deep tap root has helped reduce erosion by 97% by holding the soils while its prolific seed production and capacity for speedy regeneration make it ideal for reforestation. Methods of seed procurement, scarification, inoculation (with *Rhizobium*), and pelletization are included as are planting and land selection procedures to ensure maximum growth and utility.

A total of 94 references (1914-78) are cited throughout with appendices on *Leucaena*'s taxonomy, use as an intercrop, and potential use in the Philippines.

034

PN-AAJ-945

MF \$1.08/PC \$1.43

Nodulation and growth of lablab purpureus (Dolichos lablab) in relation to rhizobium strain, liming, and phosphorus

Zaroug, M.G.; Munns, D.N.
Hawaii University. College of Tropical Agriculture
Plant and Soil, v.53, 1979, 329-339p. : En
931061300
AID/ta-C-1207

Although *Lablab purpureus* is a very useful grain legume, rotational legume, and forage crop in tropical areas, the influence of soil acidity and phosphate deficiency on its nodulation and growth has yet to be studied. This report gives the results of greenhouse experiments conducted to identify rhizobium strains that are effective and acid-tolerant in symbiosis with *Lablab P.* and to determine whether soil acidity or the symbiotic condition increases the phosphate (P) requirement for growth.

Five rhizobial strains were tested in one neutral soil, two acid soils, and two lime soils (pH 6.6). The effects of rhizobial strain, liming, and P were then assessed by measuring nodulation, acetylene reduction, dry matter production, and nitrogen (N) concentration in plant tops. The results show that in the neutral and limed soils, three of the strains were effective, but only two remained effective in acid soil (CB756 and TAL169). Additionally, +N treatments increased plant yields significantly except for those grown in the neutral soil. Strain CB756, an established widespectrum strain for tropical legumes also capable of nodulating *Lablab P.* in low calcium and P soils, and strain CB1024 were further compared as to the effects of P, lime, and calcium chloride on their growth and nodulation in an acid soil. For both strains, nodule weight and activity increased gradually with application of P, but soil acidity reduced nodule weight and increased activity in CB1024. Nitrogen concentration in N-treated plants declined in response to applications of P, reflecting a common tendency for nutrients in excess supply to accumulate in stunted plants and become diluted when a growth limitation is relieved. In symbiotic plants, N concentration increased with the addition of P, indicating that improvement of P nutrition beyond levels necessary to maximize dry matter production commonly improves protein content of effectively symbiotic legumes. Although evidence suggests that the P requirement of symbiotic plants will increase if the soil is acid, the increase is statistically insignificant. Appended is a 16-item reference list (1937-79).

035

PN-AAJ-948

MF \$1.08/PC \$0.65

Tolerance of rhizobia to acidity, aluminum and phosphate

Keyser, H.H.; Munns, D.N.
Hawaii University. College of Tropical Agriculture
Soil Science Society of America Journal, v.43, 1979, 519-523p. : En
931061300
AID/ta-C-1207

Although previous studies confirm that low levels of phosphorus (P) and high levels of aluminum (Al) are important soil acidity factors for the growth of higher plants, little is known about their effect on rhizobia. This report details an investigation to determine the effects of low P, low pH, and high Al on



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the survival and growth rate of selected rhizobia strains and to rate the probable importance of the three stresses in inhibiting rhizobial growth. Tolerance of each stress was assessed for 75 strains of cowpea rhizobia and soybean rhizobia (*Rhizobium japonicum*) by both detailed growth studies in defined liquid media (10 strains) and a rapid method based on attainment of turbidity from a small inoculum (65 strains).

Rhizobia strains were found to vary widely in response to stress. Aluminum was found to be particularly potent; it increased the lag time or slowed growth of almost all strains and virtually stopped growth of 40%. These data verify recent evidence that some strains of slow-growing rhizobia can survive high concentrations of Al, but the large reduction in growth rate shown here could be critical for colonization of soil and rhizosphere and for induction of nodulation. Acidity generally increased lag time or slowed growth of most strains and stopped growth of about 50%. Tolerance of acidity did not necessarily entail tolerance of Al, however. About 40% of the pH 4.5 tolerant strains could not tolerate the Al toxicity that would normally be associated with soil acidity. The low P concentration inhibited growth of some strains, but with less severity than acid or Al. Comparison of Al tolerance among the two groups of rhizobia suggests that the cowpea rhizobia are more tolerant to Al than are soybean rhizobia. Nonetheless, both groups showed similar features: (1) within each group there was strain-to-strain variation in tolerance; (2) acid-tolerance and Al-tolerance were separate, as they were for more complex plants; and (3) Al at realistic concentrations appeared to be more commonly a severe stress than low pH or low P.

Ultimately, identifying mineral-tolerant rhizobium strains is important for improving the chances of selecting successful inoculants for acid infertile soils. A 23-item reference list (1917-76) is appended.

036

PN-AAJ-950

MF \$1.08/PC \$1.04

Effects of phosphorous and sulfur nutrition on soluble sugars and growth in *Clitoria Ternateal*

Zaroug, M.G.; Munns, D.N.

Hawaii University. College of Tropical Agriculture

Plant and Soil, v.55, 1980, 243-250p. : En

931061300

AID/ta-C-1207

Deficient levels of phosphorus (P) and sulfur (S) in soil affect the growth of a variety of legumes with successive cuttings, e.g., an increase in S requirements and an occasional decrease in P requirements. This report presents the results of a greenhouse trial in which *Clitoria ternatea* L. was grown through three cuttings on a deficient soil with a factorial combination of four levels of P and three levels of S and compares the results with documented observations on other plants. Since unharvested portions of forage plants are used as food reserves, (*Clitoria* is a perennial forage) another aim of the investigation was to assess P and S effects on food reserve accumulation by measuring soluble sugar concentration in roots and stubble and by evaluating etiolated regrowth (determining mass of shoot material regenerated in the dark).

The overall effect of P and S was to improve plant growth and nodulation and to increase stored concentrations of soluble sugar in roots and stubble. With successive cuttings P-deficiency decreased while the S-deficiency increased. S was probably present already in seed and soil reserves, and vigorous growth may have hastened depletion of S in later soil

combinations. Symptoms of deficiency included stunting, delayed flowering, rusty leaflets, and small leaves among P-deficient plants (which also experienced senescence of cotyledons); and chlorotic, brittle leaflets and stunting in S-deficient plants. Deficiencies of both nutrients, but especially S, reduced nodule number and size. Flowering responded best to soil with the highest P combination at first, but some flowers generally appeared later. Root and stubble dry weight, and food reserves evaluated by etiolated regrowth and by soluble sugar in roots and stubble, responded positively to both P and S, and correlate with each other and with shoot growth preceding the final cutting. For maximal etiolated regrowth, the S requirement was higher than the P requirement.

The authors propose that the primary effect of P and S in soil may have been to improve photosynthesis by increasing leaf area, enhancing carbon dioxide fixation per unit leaf area, and improving nitrogen metabolism. Appended is a 23-item list of literature cited (1949-78).

037

PN-AAJ-951

MF \$1.08/PC \$1.17

Influence of phosphorus and sulfur nutrition on composition of *Clitoria Ternateal*

Zaona, M.G.; Munns, D.N.

Hawaii University. College of Tropical Agriculture

Plant and Soil, v.55, 1980, 251-259p. : En

931061300

AID/ta-C-1207

The use of phosphorus (P) and sulfur (S) as fertilizer for forage legumes is known to positively affect plant nitrogen (N) metabolism, protein synthesis, nodule growth, sugar concentration, and eventually plant yield. To enhance the management of perennial forage plants, a greenhouse experiment on a silt loam surface soil was conducted to investigate the specific impact of P and S on yield, quality aspects, and sugar reserves in the tropical forage legume, *Clitoria ternatea* L..

Four levels of P and two N treatments were arranged in a factorial design with four replications for each treatment. Eight weeks after planting, the plants' tops were cut, oven-dried, and weighed. After the first cutting, two levels of S were imposed on the design. Five weeks later, all the plants were harvested again.

The results revealed that applications of P enhanced dry matter yield significantly in the first cutting but less so in the second. The amount of P required to produce maximum plant yield dropped from 200 mg/kg soil (or more) at the first cutting to 50-100 mg/kg at the second. The addition of S improved growth at suboptimal levels of P. At optimal levels of both P and S, symbiotic and +N plants yielded alike. Phosphorus and S fertilization caused several changes in plant composition. Nitrogen concentration was raised by S treatment and lowered by P and the combined addition of P and S lowered overall plant nitrate content. In symbiotic plants, soluble sugar concentrations were higher than in N-treated plants and were increased by P and S treatment. In N-treated plants, neither P nor S increased the concentration of reducing sugar but did increase total sugar. Appended is a 22-item list of literature cited (1950-80).



038

PN-AAJ-952
MF \$1.08/PC \$6.65

Tolerance of soil acidity in symbioses of mungbean with rhizobia

Munns, D.N.; Keyser, H.H.; Fogle, V. W.; Hohenberg, J. S.;
Lauter, D. L.; Zaroug, M. G.; Clarkin, K. L.; Whitacre, K.
W.; Righetti, T. L.

Hawaii University. College of Tropical Agriculture
Agronomy Journal, v.71, 1979, 256-260p. : En
931061300
AID/ta-C-1207

Soil acidity is known to inhibit rhizobial growth, colonization of the host rhizosphere, infection, and the activity of established nodules. To measure the variation in tolerance of soil acidity among rhizobial strains, several greenhouse trials were conducted in which 40 strains were applied as separate seed inoculants to two cultivars of mung bean *Vigna radiata* L.. Performance was measured by nodulation, growth, and nitrogen (N) yield of the host plant. The plants grew either in a low N, low calcium acid subsoil (pH 5.0), or in a lime soil (pH 6.3).

The data show a large and perhaps continuous range of rhizobial tolerance to soil acidity, unrelated to variation in strains' effectiveness, measured by plant performance under favorable conditions at pH 6.3. A few were very sensitive, failing to nodulate at pH 5.0. About half were moderately sensitive with significantly impaired nodulation and growth at pH 5.0. The remainder were tolerant, supporting growth at both soil pH values. Two strains, 425 and m7, combined tolerance with high effectiveness on both hosts.

A strain's acid tolerance could not be predicted from the abundance or effectiveness with which it nodulated at favorable pH, or from its growth rate or acid production in a conventional yeast mannitol medium, as has been hypothesized.

The authors speculate that perhaps there is an acid-sensitive step after colonization of the rhizosphere in mung bean as in alfalfa and pea. A few strains showed sensitivity on one host cultivar and not on the other, implying that a valid comparison of the acid tolerances of symbiotic legumes cannot be made in trials with only one inoculant. Appended is a 15-item list of literature cited (1965-79).

039

PN-AAJ-953
MF \$1.08/PC \$5.2

Phosphorus nutrition of rhizobium japonicum: strain differences in phosphate storage and utilization

Cassman, K.G.; Munns, D.N.; Beck, D. P.
University of California, Davis. Department of Land, Air, and
Water Resources

Soil Science Society of America Journal, v.45(3), 1981, 517-
520p. : En
931061300
AID/ta-C-1207

To determine the extent to which the storage and reutilization of phosphates might influence the ability of rhizobia to establish effective nodulation, this report, part of a larger study on phosphorus (P) nutrition of rhizobia and legumes, presents the results of experiments to assess phosphate accumulation in six strains of *Rhizobium japonicum*.

Overall, the report concludes that the extent to which plant cells store P and use it to support subsequent growth depends

on the strain and also, tentatively, on the strain's serogroup. Total cell P concentration, depending on the strain studied, ranged from 1.6 to 2.4% dry mass. Stored cell P was found to support up to four or five plant generations and thus steps to ensure high-P storage in inoculant cultures could be important ecologically and agronomically for tolerance to low-P conditions. The total cell P threshold for growth was 0.3%. The ability of rhizobia to multiply in a low-P environment may be important even where the soil is not deficient for the host plant because the rhizosphere, vital to rhizobia multiplication, is rapidly depleted by the plant root even in normal soils. However, because rhizobia are unlikely to be able to accumulate enough stored P from the soil to carry them through colonization of the root rhizosphere, storage might have to be supplemented by effective absorption of P from extremely dilute solutions.

Data tend to confirm that electron-dense granules contain phosphate and are a significant, although not the only, form of P storage. Cells grown at an intermediate external solution-P concentration resembling that in fertile soil had few granules and only a moderate amount of stored P (1.31.7%). Gumminess, implying accumulation of external polysaccharides, was abundantly produced at low and moderate P supply, but not at high P concentrations. If moderate P stress is normal for rhizobia in the field and if the polysaccharides have functions, it may be significant that gum production is suppressed by the high P routinely supplied in culture media. Appended is a 15-item bibliography (1958-81).

040

PN-AAJ-954
MF \$1.08/PC \$5.2

Response of rhizobium strains to acid and aluminum stress

Munns, D.N.; Keyser, H.H.
University of California, Davis. Department of Land, Air, and
Water Resources

Soil Biology and Biochemistry, v.13, 1980, 15-18p. : En
931061300
AID/ta-C-1207

Of the effects produced on *Rhizobium* by the combination of acid and aluminum stress (AAS), reduction of the cellular multiplication rate is the one most important for colonization of soils and roots and is most consistently expressed in defined media. The degree of multiplication inhibition depends on the tolerance levels of different *Rhizobium* strains. Even within strains, however, a small percentage of the population may be resistant to AAS and the initial mortality or lag followed by population growth might be due to death or stasis of a sensitive majority while a tolerant minority multiplies.

To shed more light on this possibility, the experiment described in this report tests two hypotheses: (1) that reduction in net multiplication rate under AAS is partly due to an increase in cell death rate; and (2) that enough genetic variation exists to permit within-strain selection for enhanced tolerance. Both hypotheses were rejected after experimentation—the first by synchronous culture experiments showing a dominant effect of AAS on interdivision time; the second by constancy of tolerance despite serial subculture or multiple colony isolations in stress media.

In synchronous cultures, AAS reduced the frequency of cell division. Non-dividing cells did not die, consistent with evidence that similar rhizobia can survive exposure to millimolar concentration of Al salts, but those near division showed evidence of heightened sensitivity to Al³⁺ and H⁺. This effect, tentatively



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confirmed by adding Al to synchronous cultures at different times could cause the less than twofold multiplication observed in synchronous culture.

Neither prolonged culture under stress nor isolation of successful colonies on stress medium altered the tolerance of strains established and maintained in normal fashion. The authors conclude that while a strain's tolerance might be improvable by selection after artificial mutagenesis, it appears that spontaneous mutation towards tolerance is not abnormally frequent, that naturally tolerant variants within strains are unlikely, and that a strain's degree of tolerance is a stable property. Appended is a 9-item reference list (1940-78).

041

PN-AAJ-955

MF \$1.08/PC \$5.52

Growth of rhizobium strains at low concentrations of phosphate

Cassman, K.G.; Munns, D.N.; Beck, D. P.

University of California, Davis. Department of Land, Air, and Water Resources

Soil Science Society of America Journal, v.45(3), 1981, 4p. : En

931061300

AID/ta-C-1207

Research shows that large differences in tolerance among rhizobia strains to low levels of phosphorus (P) could have significant consequences for legume growth and vitality. This paper describes a new process—which could save the expense of soil or field inoculation trials—for screening rhizobia strains which are sensitive to P-deficiencies and thus inappropriate for cultivation in P-deficient soils and rhizospheres. An iron oxide dialysis culture system was developed to test the P responses of seven strains of soybean and cowpea rhizobia grown from P-depleted inocula.

The experiment revealed distinct differences between strains in their ability to store P at high external P concentration, as well as their ability to grow at low external P concentration. Both properties might be important in adaptation to natural varying P environments. Two P-efficient strains (USDA I10 and CB 756) grew as rapidly at the lowest P concentration as in a control medium and would seem unlikely to be P-limited in the field. Other strains were less efficient; one in particular (USDA I42) could barely grow at moderate P concentrations and would have difficulty colonizing P-deficient soils or normal rhizospheres.

The authors conclude that although complicated in the laboratory, this dialysis technique could be simplified for more routine screening of strains and its operation could be modified for research on nutrition and requirements of P-efficient rhizobia in other organisms. Appended is a 10-item bibliography (1966-81).

042

PN-AAJ-957

MF \$1.08/PC \$5.52

Soil acidity tolerance of symbiotic and nitrogen-fertilized soybeans

Munns, D.N.; Hohenberg, J.S.; Righetti, T. L.; Lauter, D. J.

Hawaii University. College of Tropical Agriculture

Agronomy Journal, v.73, 1981, 407-410p. : En

931061300

AID/ta-C-1207

Although acid soil greatly depresses growth in most legumes by impairing nodulation, this study presents evidence to indicate that for soybeans, aluminum (Al) toxicity inhibits growth more than does soil acidity. Two lime nitrogen (N) factorial trials with acid soils were conducted to observe lime effects on nodulation, early growth, and N concentrations in symbiotic soybean plants as compared with control plants. Each trial soil was high in exchangeable and soluble Al. In both trials, liming from pH 4.4 to 6.0 doubled growth, regardless of N source, cultivar, or *Rhizobium* strain or numbers. Inoculated plants were nodulated, green, and high in N even when their growth was severely acid-affected.

Symptomatic indications that soybean growth in the acid soils was limited by Al toxicity to the host plant were confirmed in solution culture experiments with pH, Al, and calcium (Ca) controlled at levels resembling those found in extracts of the soil solutions. Growth was unaffected by low Ca or low pH, but was depressed by Al.

These data suggest that efforts to improve acid tolerance in the soybean should center on plants, not rhizobia. Further, if the soybean can nodulate effectively in acid soil where its growth is severely limited by Al toxicity, then soybeans are an exception to the generality that legumes fail in acid soil because of poor nodulation. Consequently, it is justifiable to ignore rhizobia and supply N when screening for acid-soil tolerance in soybeans.

The authors conclude that although these findings are consistent with other field trials, there is evidence to imply that they can be expected only in the large group of acid soils where Al toxicity is the dominant limitation. A 14-item list of cited literature (1929-79) is appended.

043

PN-AAJ-980

MF \$1.08/PC \$7.28

The winged bean: a high protein crop for the tropics

National Research Council. Commission on International Relations. Board on Science and Technology for International Development

1981, 58p. : En

Previous edition, 1975, 49 p.: PN-AAB-319

931122300

AID/ta-C-1433

A 1975 report on the nutritional merits of the winged bean, *Psophocarpus tetragonolobus*, encouraged the crop's spread from Papua New Guinea and South East Asia to over 70 countries in the hope that it could become a major plant protein source for the tropics, as soybean is in temperate zones. This paper updates the 1975 report and details winged bean's agronomy, food use, and nutritive value.

This "supermarket on a stalk" provides six different foods (leaves, pods, seeds, tubers, flowers, and shoots) while duplicating soybeans nutritionally in regard to their protein, oil, mineral, vitamin, and essential amino acid content. Pods, the most popular part of the plant, can be eaten raw or cooked and have a protein content of 2.4g per 100g. Mature dry seeds contain as much protein and nutritional energy as the soybean and are thought to be more palatable. Tubers have an 8-20% protein content, flowers contain nectar, and leaves have a high tryptophan and vitamin A content.

Winged beans thrive in hot humid areas with 2,500 mm or more of annual rainfall, yet some variants are drought resistant and have proven resilient in different climates and soils. In



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044

PN-AAK-041

MF \$1.08/PC \$12.48

Bean Program; 1980 report

Centro Internacional de Agricultura Tropical
1980, 87p. : En

Part of a series of 1980 annual reports produced in English and Spanish for CIAT's cassava, beans, rice, and tropical pastures programs

The Centro Internacional de Agricultura Tropical (CIAT) Bean Program concentrates its resources on developing multiple disease- and insect-resistant germplasm in grain types that meet local consumer needs. This review of the 1980 program analyzes CIAT's genetic improvement and progeny evaluation activities, specific studies on *Phaseolus vulgaris* and eight other legumes, and the development of improved agronomic practices and new technology in farm trials.

The year's major effort was devoted to continued improvement of germplasm for genetic resistance. Common bacterial blight resistance increased greatly among entries in the 1980 Bean Team Nursery (VEF). More stable disease resistance is being investigated through regional testing for rust (*Uromyces phaseoli*), anthracnose (*Colletotrichum lindemuthianum*), and angular leaf spot (*Isariopsis griseola*) as they exhibit pathogenic specialization. Anthracnose resistance frequently increased and parents resistant to angular leaf spot were identified for future crossing. The Program's increased emphasis on multiple factor resistance breeding has increased the feasibility of developing leafhopper (*Empoasca kraemeri*) resistance by eliminating susceptible lines according to visual damage scores and then selecting highly resistant lines on the basis of reproductive adaptation and yield loss data. The resistance to bean common mosaic virus, although difficult to obtain in large-seeded red genotypes, has succeeded, with all new breeding lines being true-breeding resistant.

Other main areas of research included identifying drought-resistant strains, evaluating screening methods for future drought tolerance research, treating dry beans with vegetable oils to protect against storage insect pests, and testing hybrid selections in areas where low soil phosphorous is an important production constraint. Training, both short courses on bean production and longer courses to enhance national program research capabilities, remained a crucial component of CIAT's activities. During 1980, varieties of BAT 10, 76, and 41 and Acacias 4 were planted in Cuba, Bolivia, Honduras, and Nicaragua, and a new CIAT intermediate altitude station was acquired near Popayan, Colombia. A list of Program publications and two appendices on *P. vulgaris* are included.

045

PN-AAK-073

MF \$6.48/PC \$65.26

Proceeding of the International Workshop on Pigeonpeas: vol. 1

International Crops Research Institute for the Semi-Arid Tropics

(International Workshop on Pigeonpeas, Patancheru, IN, 15-19 Dec 1980)

1981, 515p. : En

931097200

DAN-0972-G-00-1007-00

Increasing production and use of the pigeonpea, a grain legume grown throughout the tropics and especially in India, could greatly improve the diet of almost one-third of developing

Thailand, as many as 1,000 nitrogen-fixing root nodules have been found on a single plant, demonstrating that exceptional ability to fix nitrogen which results in the plant's high protein content. The many varieties of winged beans, (e.g. 500 in Thailand, 200 in Bangladesh) display different physical features and nutritional variations among the parts of the plant.

The main constraint to winged bean production is the laborious and relatively costly staking process required for increased yields of pods, seeds, and tubers. Commercial processing of the winged bean for tempeh, tofu, flour, gruel, and animal feed is being researched. Further studies of anti-nutritional factors, nematodes, and seed-borne virus diseases are needed. Precautions should be taken with seed introductions and exchanges as virus diseases and nematodes that limit winged bean yields have been discovered in the Ivory Coast, Indonesia, and elsewhere. Appendices include information on winged bean pests and diseases and a 122-item (1906-81) selected readings list.



The winged bean, a "supermarket on a stalk," yields edible pods, leaves, seeds, tubers, flowers, and shoots and duplicates the nutritional content of soybeans.



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country populations. This report presents proceedings of an international pigeonpea workshop and consists of 43 papers on cropping systems (5), environmental adaptation (2), entomology (2), pathology and weed management (3), physiology and microbiology (4), plant nutrition (6), soils and water (3), seed production (4), utilization (7), and breeding methodologies and strategies (7). Five final papers synthesize conference presentations and suggest areas for future study.

According to a paper on pigeonpea production, more research is needed to evaluate and develop nontraditional soil cropping systems; assess alternative intercropping systems; develop information on optimum plant density, spatial arrangement, and moisture and nutrient removal patterns; evaluate pigeonpea ratooning; study genotypic adaptations to changes in temperature and photoperiod; and determine critical soil and plant nutrient concentrations.

Regarding pigeonpea entomology, it is recommended that finance be allocated for necessary short-term research; that control component researchers assemble available components; and that the remaining control gap be quantitatively identified and addressed.

In the area of pigeonpea pathology, basic research leading to disease control strategies should be stressed; priority should be given first to developing genetic resistance and then to investigating alternative methods of control; disease problem-solving efforts should be interdisciplinary; and a regional and global attack on pigeonpea diseases should bolster continued national efforts.

Presentations on pigeonpea use indicate the need to develop improved processing, storage, and distribution systems, and to improve the nutritional quality and cooking characteristics of pigeonpea varieties.

In regard to pigeonpea breeding, research should focus on limitations to the pigeonpea's genetic base knowledge of its genetic determination the exploitation of heterosis, and environmental adaptation. References are included with the individual papers, and a list of the workshop's participants and observers is appended.

046

PN-AAK-123

MF \$1.08/PC \$.65

Rhizobium inoculants for developing countries

Burton, J.C.

Hawaii University. College of Tropical Agriculture
Tropical Agriculture (Trinidad), v.58(4), 1981, 5p. : En
931061300
AID/ta-C-1207

The practice of culturing rhizobia to enhance the growth of legumes is increasing as the role of legumes as a major food protein supplier in developing countries gains importance. This report gives a broad account of the preparation, use, quality control, marketing, and distribution of *Rhizobium* inoculants for leguminous crops.

The rhizobia supplied by the inoculum infect root hairs of the host and cause nodules to form. Housed in these nodules, the rhizobia obtain food and energy from their host. The bacteria, in turn, gather or fix atmospheric nitrogen for plant growth. The general requirements of the *Rhizobium* strain are ability to form nitrogen-fixing nodules on the plant; competitiveness in nodule formation and survival in the presence of other infective rhizobia; prompt nodulation and good nitrogen fixation over a wide range of root temperatures; good growth ability in culture medium in the carrier and in soil; persistence or survival in the soil; and effectiveness on a wide range of host genotypes.

The rhizobia are usually mixed with a solid carrier which serves as their home until they are used by the farmer. Carriers provide a surface for growth of the bacteria and must permit gas exchange, particularly of oxygen. Food carrier material should be highly absorptive and easy to process, nontoxic to rhizobia, easy to sterilize, available in adequate amounts, inexpensive, and adhere well to seeds. Peat, charcoal, clay, bagasse, lignite, coal, compost, straw, and pulverized minerals such as vermiculite and apatite have been used as carriers with varying degrees of success.

The accepted method of using inoculants is to apply an aqueous slurry of the carrier base inoculant to seed just before planting. The amount of inoculum applied to seed varies from 2 to 25 g/kg of seed depending upon the brand and kind of legume seed. Soil inoculants (as opposed to seed inoculants) are usually more expensive but can be modified more easily for small farmers. An inoculant should be used within 4 to 6 months after it is made, and should be kept as cool as possible. As to proper distribution, inoculants must be handled as perishables since they contain live bacteria. Included is a 9-item bibliography (1932-79).

047

PN-AAK-699

MF \$2.16/PC \$22.10

World peanut production, utilization and research

Cummins, David G.; Jackson, Curtis R.

University of Georgia. College of Agriculture Experiment
Stations

Special Publication, no.16, Apr 1982, 165p. : En
936401300
AID/DSAN-G-0247

Peanuts (*Arachis hypogaea* L.), traditionally an important food source in developing countries, have recently entered world trade as a source of oil and food. This report presents background material for a collaborative peanut research program between U.S. and developing country scientists aimed at identifying and resolving constraints to peanut production and use in developing countries.

A survey of peanut production and use and the current status of peanut research is provided for eight high-technology and 25 low-technology countries (which includes 12 Caribbean countries treated collectively). The survey consists of statistical data derived from the U.S. Department of Agriculture and brief country reports based on site visits, correspondence, the 1980 International Workshop on Groundnuts (IWG), and other personal contacts. It is noted that data in the survey's two sections might vary. A short list of books, bulletins, and proceedings dealing with peanuts is included along with a list of domestic and international peanut research institutions (the former according to region and country) and granting agencies such as A.I.D. and the World Bank which support such research.

Summarizing data gleaned from personal interviews during site visits, responses to a worldwide survey, and from IWG country reports, the authors cite the frequency and geographical distribution of the 13 main constraints to peanut production: breeding and genetics; weeds, insects, diseases, and nematodes; cultural practices; mechanical technology; education and training; physiology and soil microbiology; seed technology; nutrition and food science; economics; aflatoxins; sociocultural factors; farming systems; and storage. Research programs being conducted in the United States on key constraints



are detailed, along with peanut research projects conducted by USAID, other countries, and international agencies.

A final section is devoted to four papers on the socioeconomics of peanut production and utilization; pre- and post-harvest handling of peanuts; food processing and product development; and peanuts in human nutrition. All four papers have bibliographies appended.

048

PN-AAK-774

MF \$1.08/PC \$4.68

Weed-fertilizer interactions in rice

Moody, K.

International Rice Research Institute

IRRI Research Paper Series, no.68, 1981, 37p. : En

Weeds growing in proximity to crops such as rice compete for the same nutrients, thereby inhibiting crop growth and reducing yields. This paper presents data from worldwide field trials on the effects of nutrients, especially nitrogen (N), on weed growth and rice production.

Given that weeds usually grow faster and thus absorb available nutrients first, application of fertilizers can cause a greater increase in weed growth than in rice yield. Data on rice yields in weeded and non-weeded and in fertilized and non-fertilized fields show variable, sometimes contradictory results. The magnitudes of nutrient absorption by different weed species are indicated.

Maximizing the actual benefits to rice of high N fertilization is examined with regard to: (1) the timing of fertilizer application (application to a previous crop, before planting, or after planting) and the relation of application to the type of rice planting (transplant, wet-seeded, dry-seeded wetland, or dryland); (2) the method of land preparation (no tillage, stale-seedbed, or conventional tillage); (3) the rice cultivar grown (modern or traditional variety); (4) crop canopy, plant population, and plant density; and (5) the composition of the weed flora (i.e., the effect of added fertilizer on 14 different weeds and comparison of the competition caused by different weeds).

Because increased fertilizer application is most effective only if improved cultural practices are used simultaneously, weed control—both chemical and manual—takes on added importance. The authors discuss several herbicide-fertilizer mixtures (e.g., phenoxy herbicides, propanil, butachlor), and explore the use of ferns (*Azolla*) and blue-green algae as natural weed controllers. The authors conclude with a brief review of research on nutrients other than N.

The text is highlighted by numerous tables, graphs, and charts and a 128-item bibliography (1927-81) is included.

049

PN-AAJ-671

MF \$1.08/PC \$6.37

A legume-based, pasture production strategy for acid infertile soils of tropical America

Sanchez, P.A.

North Carolina State University

1981, 48p. : En

931129100

AID/DSAN-G-0133

Inappropriate land use by farmers, forced by population increases to cultivate lands in acid infertile soil regions, is the cause of widespread erosion in high base status soils in tropical

America. This paper describes the rationale and outlines the components of a low input soil management strategy designed to replenish these soils into legume-based pastures for beef production by taking advantage of acid soil infertility instead of trying to overcome it with large lime and fertilizer applications.

Although not all the strategy's components are adequately known, the principal components include: (1) use of land resource evaluation studies to select soils suitable for crop-pastures systems, avoiding soils with severe physical constraints; (2) use, in rainforest areas, of appropriate land clearing methods such as slash-and-burn (including its use after mechanized land clearing); (3) selection/breeding of productive, persistent, and compatible pasture grass and legume cultivars tolerant to high levels of aluminum (Al) saturation, low levels of available soil phosphorus (P), major diseases and insects, drought, and burning; (4) supply nitrogen to the system by inoculating legumes with effective, acid-tolerant *Rhizobium* strains; (5) use low-cost, low-reactivity rock phosphates which become readily available when the soil is kept acid and Al-tolerant plants are grown; (6) correct other soil nutrient deficiencies, especially of potassium, sulfur and micronutrients; (7) use low-cost pasture establishment methods such as low-density seedings or interplanting with crops; (8) use low-cost pasture reclamation techniques such as restocking P after burning regrowth; and (9) for extensive cow-calf operations, place 10% of the grazing area in improved pastures. Initial results show that this strategy can provide a continuous protective cover against erosion, promote nutrient recycling, and improve some soil chemical properties.

A 47-item bibliography (1965-80) in English, Spanish, and Portuguese is appended.

050

PN-AAJ-927

MF \$1.08/PC \$12.35

Soils of Equatorial Africa and their relevance to rational agricultural development

Donahue, R.L.

Michigan State University. College of Agriculture and Natural Resources

MSU Research Report, no.7, 1970, 82p. : En
AID/afr-459

Low agricultural yields in the 8.625 million square miles that make up Equatorial Africa can only increase if a more scientific use is made of the soil. This report studies soil characteristics, taxonomy, cultivation, and fertility in Equatorial Africa and suggests methods for increasing productivity.

Predominant characteristics of soils in Equatorial Africa as compared to soils of humid temperate regions are: deeper pedons with fewer remaining weatherable minerals; lower percentages of silicon and montmorillonite; higher percentages of iron, aluminum, and kaolinite; lower cation but higher anion exchange capacities; lower buffer and available water capacities; higher degree of friability; less accumulation of leaf litter; a laterite layer that hardens with exposure to cycles of wetting and drying (continuous cropping); and smaller reserve of total and available plant nutrients.

Soil taxonomies of Equatorial African soil are provided using both the U.S. and the D'Hoore systems. The U.S. system classifies these soils as 22% Oxisols, nearly 32% Aridisols, 23% Alfisols, 11% Entisols, 6% Inceptisols, 4% Ultisols, and 2% Vertisols; and describes suborders, vegetation, moisture, texture, and soil temperature characteristics. Special attention



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is focused on the soils of Ethiopia and Ghana and on ground-water laterites.

The predominant crop pattern in Equatorial Africa—shifting cultivation (i.e., allowing land to “bush” so that trees can shade the soil and return biomass to the soil surface)—is likely to continue along with the subsistence agriculture system that will dominate for the foreseeable future. The author gives reasons for continued low productivity and a lack of alternatives to the shifting cultivation pattern: (1) high cost of technological inputs (e.g., fertilizer); (2) scarcity of rural infrastructure (e.g., roads); (3) prevalence of human and animal disease; (4) lack of individual owner-operated farms; (5) high illiteracy rates; and (6) a preponderance of small, fragmented farms on infertile land.

Recommendations focus on finding potentially desirable soils through an extensive soil and land-use survey, increasing technological and economic inputs, and adapting (versus transferring) westernized technology to the tropics. Maps, charts, and tables of soil composition in Equatorial Africa are included.



051

PN-AAJ-979

MF \$2.16/PC \$18.72

Calculated soil moisture and temperature regimes of South America: a compilation of soil climatic regimes calculated by using a mathematical model developed by F. Newhall

Van Wambeke, Armand

Cornell University, Department of Agronomy

SMSS Technical Monograph, no.2, 1981, 147p. : En

931122900

PA/AG/DSB-1129-5-79

Soil moisture regimes (SMR's)—tables providing quantitative data on soil moisture and temperature—can aid in land use planning by defining soil limitations on plant growth, creating kingdoms within the soil classification system, and facilitating the preparation of generalized soil maps. This report uses a mathematical model developed by F. Newhall (a rough method designed to identify moisture regimes in areas where climatic and other input data are limited) to calculate SMR's for 1,100 stations throughout South America.

The model is limited as data is often averaged over a period of years; SMR's do not include topsoil in calculations, resulting in a lack of knowledge on the availability of water for plants; and losses/gains in rainfall from poor drainage conditions are not measured. The five moisture regimes used are found in the original text of Soil Taxonomy (1975)—aridic, xeric, ustic, udic, and perudic; while temperature regimes include pergelic, cyric, frigid, mesic, thermic, hyperthermic, isofrigid, isomesic, isothermic, and isohyperthermic. Due to fears that the 5 moisture regimes might not be sufficiently uniform, 14 subdivisions were included in computer programs using criteria that are assumed to occur in at least 6 out of 10 years. Subdivisions include: extreme, typic, and weak aridic; dry and typic xeric; aridic, typic, and udic tropustic; xeric, wet, and typic tempustic; typic udic; dry tropudic; and dry tempudic.

Maps and tables are developed for Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Surinam, Uruguay, and Venezuela. Each country table presents moisture regimes and temperature regimes and lists the stations for which climatic parameters were calculated. A 7-item bibliography (1972-79) is appended.



DEVELOPMENT ASSISTANCE

052

PN-AAJ-065

MF \$2.16/PC \$17.94

Implementing development programs: a state-of-the-art review; final report

Ingle, Marcus D.

U.S. Agency for International Development. Bureau for Development Support. Office of Rural Development and Development Administration

Jan 1979, iii,133p. : Bibliography p.77-132, En

Executive summary: PN-AAJ-066

AID/ta-147-612

Approaches to implementing development strategies should be reappraised to fit the "New Directions" development strategy. This paper reviews the state-of-the art of the implementation of both public sector projects and more limited development projects in order to identify improved approaches to implementation.

A review of the academic and scholarly literature details program implementation approaches encompassing both macro program approaches (e.g., Western Technology Approach) and discrete project implementation approaches (e.g., Implementation Cycle Approach). Factors which facilitate and/or impede program implementation are included along with a review of conventional and emerging implementation approaches in general administration (e.g., institution-building strategy) and project categories (e.g., target group involvement strategy). It is noted that in developing countries a process approach to implementation is preferable to one based on adherence to a blueprint.

A second section reviews the program implementation policies as described in the official documents of developing countries, donor agencies, and multilateral assistance organizations. Although a suitable implementation approach is recognized as crucial to project success, there is no real consensus among organizations about how to implement development policies. Major problems include the lack of management talent on lower administrative levels and an inability to match implementation strategies to local conditions.

A final summary section concludes that a comprehensive implementation model which incorporates major approaches and strategies is needed. Recommendations include: (1) redirect programming priorities to gain an understanding of how development projects succeed; (2) emphasize indigenous management strategies; (3) encourage innovative responses to program implementation opportunities; and (4) simplify and adapt existing models of institution-building and organizational viability to make them operational.

A select list of scholarly literature and official documents with annotations are included along with 296 references (1961-78).

053

PN-AAJ-884

MF \$3.24/PC \$32.76

Rural development in the 1980's; executive summary and conference proceedings

U.S. Agency for International Development. Bureau for Development Support. Office of Rural Development and Development Administration

(International Conference on Rural Development in the 1980's, Shenandoah National Park, US, Nov 1979) 1979, 245p. : En

In 1979 A.I.D. sponsored an international conference on the challenge of poverty and rural development in the 1980's. The proceedings of the conference, here presented, include conference workshop deliberations, formal and panel presentations, and special sessions. Also presented is an executive summary providing the main consensus points about rural development projects: (1) projects do not take place in a policy vacuum; (2) decisionmaking should be decentralized to strengthen local capacities; and (3) personnel from many disciplines should be involved.

In response to the above points participants recommend that donor agencies: (1) encourage local participation in all project stages; (2) keep project implementation responsibility at the lowest possible level; (3) weigh the trade off of short-run costs and benefits and long-run social benefits and burdens; and (4) shorten the time between project identification and implementation.

Summaries of seven workshops cover technical deliberations, organization and mobilization issues, conclusions, and recommendations. Topics were small farmer and rural household production systems; rural financial markets; market access, agricultural pricing, and food distribution; rural enterprises and off-farm employment; rural public works; providing social services in rural areas; and development of and access to natural resources.

Six cluster panel presentations discuss organization and mobilization issues behind the private and public sectors' need to build institutional capacity. Special session reports focus on rural development methodology and special issues (e.g. forestry, women). Studies from Zaire, Yemen, Nicaragua, and the Philippines are provided to examine workshop and cluster findings in the light of actual cases. Finally, formal presentations discuss the World Conference on Agrarian Reform and Rural Development, alternative perspectives on rural development, and the role of intermediaries. A list of participants and a detailed conference agenda are appended.

054

PN-AAJ-888

MF \$1.08/PC \$4.81

Capital saving technology in the U.S. foreign assistance program in Cameroon; a field survey

Vlinski, C.A.

1980, 37p. : En

698013500

AID/afr-C-1618

While capital saving technology (CST)—which features small capital investment per beneficiary and responsiveness to local resources, needs, and desire for autonomy—is not the focus of any single A.I.D. project, some A.I.D. projects are successfully using CST principles. This report presents case studies of two such projects in Cameroon: North Cameroon Pilot Community Development (NCP) and Centers for Training Young Farm Families (CTF).

In the NCP project, activities in water resource development, agriculture, forestry and animal husbandry, formal and non-formal education, and primary health care are being implemented in five pilot villages. The project, designed to use local resources to develop technologies adapted to local needs, is being implemented through village workers and committees. After a slow start, due in part to the resistance of local authorities to some technologies being introduced, the project is gaining momentum. Some technologies being used are



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simple and inexpensive, such as pulleys and hand shovels for well-digging, while others such as a prototype, locally-built, and oxen-pulled shovel to replace bulldozers are rather costly. Major positive factors have been access to human resources as well as to A.I.D. funding in excess of normal Government of Cameroon (GOC) funding for such efforts.

The aim of the CFT project is to establish centers to train farm families to use improved rural technologies such as animal drawn equipment. Married couple trainees (to whom training has been restricted, since bachelors own no land), return home to demonstrate techniques to other farmers. This has led to the real possibility of developing a small-scale farm equipment enterprise in the north. High training costs (largely being paid by the GOC, thus partially meeting one criterion of CST projects) may be justified if CFT leads to increased farm production and income. Steps are being taken to correct one weakness of the project—lack of a supplemental training program for women in areas such as hygiene and nutrition.

The author concludes by identifying other in-country opportunities for CST in small-scale enterprise and community development. A 9-item bibliography (1977-79) is appended.

055

PN-AAJ-940

MF \$1.08/PC \$3.64

Joint assessment of U.S. assistance programs in Senegal; final report 1980

U.S. Agency for International Development. USAID/Senegal 1980, 28p. : En

Produced in cooperation with the Government of Senegal's Ministry of Planning and Cooperation

High oil prices combined with a disastrous 1979-80 growing season have produced the most difficult economic situation in Senegal's history. Against these gloomy facts, this study reports on current USAID/Senegal projects in livestock, grain, irrigation, and rural health.

All programs suffered from implementation and productivity problems due to insufficient technical assistance from A.I.D. and poor management on the part of the Government of Senegal (GOS). Full reports on all but the health program are impossible due to a lack of information collection. Of the 26 watering ponds planned for the Eastern Senegal livestock breeding program, only two were dug in 1979 and only 10 more are planned for 1980. Protracted labor negotiations, lack of beneficiary participation, and non-existent plans for meat marketing were the primary reasons for low output. The grain production project, designed to increase millet production, diversify crops, and provide grain self-sufficiency, failed because unanticipated blockages throughout the grain production system (from seed delivery to marketing) reduced the amount of grain that went to consumers. Further, consumer preference for rice and the lower cost of imported millet have called the whole project into question. While the Bakel irrigated perimeters project did achieve some success (of farmers surveyed, 40-68% enjoyed a subsistence consumption surplus and 7-23% had a marketable surplus), insufficient worker training and a lack of timely technical assistance and provision of materials hampered project effectiveness. The Sine Saloum health care project to establish a system of village health huts to assist in childbirth, dispense first aid and basic medicines, and improve sanitation, formally began in 1977. Due to poor management, however, huts in only two of five target areas are functioning.

It is recommended that A.I.D. stress increased rural productivity and improved project management; forge better linkages

between individual projects and GOS macroeconomic needs; involve beneficiaries in the original project design; improve efficiency by increased use of local currency; and establish, wherever possible, collaborative project processes with other international donors.

056

PN-AAK-005

MF \$3.24/PC \$29.38

Development issues: U.S. actions affecting the development of developing countries. The 1982 annual report of the Chairman of the Development Coordination Committee

Development Coordination Committee

1981, 227p. : En

Earlier editions: 1981, PN-AAJ-180; 1980, PN-AAK-542; 1978, PN-AAG-577; 1977, PN-AAG-576; 1975, PN-AAG-575; 1974, PN-AAG-574

A review of 1981 official U.S. bilateral and multilateral development assistance reveals a new emphasis on encouraging developing countries (DC's) to formulate more effective economic policies and on increasing the role of the private sector in global development activities. Besides providing such a review, this report assesses the position of DC's in the world economy and formulates U.S. priorities for future assistance.

Given the bleak prospect for DC growth in the near future (due primarily to poor industrial country growth, DC dependence on high-priced oil imports, and a reduction in external concessional aid), DC's must increasingly depend on domestic resource mobilization and on sound internal economic policies which lead to greater efficiency and growth, e.g., improve the functioning of markets and allow the private sector to operate more freely, enforce resource-efficient pricing regimes, limit public expenditures to socially and economically viable projects, and restrain inflation. Accordingly, U.S. development policy is based on three premises: (1) assistance should be based on distinctions between types of DC's, e.g., newly industrializing countries, middle-income countries, etc.; (2) multilateral and bilateral aid projects should complement and reinforce each other; and (3) the poorest of the DC's deserve most of the concessional aid.

The major sectoral policies for bilateral assistance are food and agriculture, particularly nutrition and food security; energy, particularly in facilitating private sector alternatives to oil and timber; and human resources, especially in improving DC's health, nutritional, educational, and population status.

U.S. multilateral assistance will continue to promote steady economic growth based on the market-oriented international economic system and to show concern for alleviating poverty and improving DC material well-being.

All U.S. assistance will focus on facilitating the role of the indigenous and international private sector, strengthening local institutional capabilities, mobilizing human resource potentials, and developing appropriate technologies.

057

PN-AAK-045

MF \$1.08/PC \$2.21

Integrating rural development: the problem and a solution

Rubin, Henry
International Development Institute
1979, 16p. : En



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The philosophy of integrated rural development (IRD) was incorporated into many development projects in the 1970's, yet met with little practical success. This paper argues that the lack of a methodology to coordinate the efforts of participating government line agencies is a principal reason for this lack of success.

Cooperation among line agencies (e.g., local governments) involved in IRD projects is rare, as bureaucratic organizations compete for limited resources, guard their autonomy, and lack the funds needed for effective regional planning. The author contends, however, that IRD is possible through the establishment of effective organizations to plan and facilitate coordination among line agencies. An external party (e.g., central government, international donor) could establish such an organization to provide a setting for information sharing among line agencies; funding for line agencies for IRD projects; and effective long-term local planning. Coordinating organizations must be strong enough to enlist support from line agencies while avoiding program implementation so as not to threaten the budgets, staff, or resources of the line agencies.

A case study of an effective IRD project coordinated by the Bicol River Basin Development Program (BRBDP) in the Philippines is analyzed. The BRBDP effectively established a well-trained organization in an isolated rural area, focused national and international attention on the Bicol Region, and coordinated social and infrastructure projects involving many line agencies. The BRBDP successfully illustrates that effective IRD programs require a coordinating organization that: (1) cooperates with line agencies; (2) coordinates and plans rather than implements projects; (3) facilitates informal and formal communication among line agencies; (4) provides incentives to employees to move laterally within IRD efforts; (5) possesses some regional autonomy; and (6) provides planning and coordinating incentives through funding of IRD efforts.

A 26-item (1965-77) list of references is included.

058

PN-AAK-047

MF \$3.24/PC \$34.71

Design and evaluation of AID-assisted projects

Smith, K.F.

U.S. Agency for International Development. Office of Personnel Management. Training and Development Division

1980, 267p. : En

A.I.D.'s Project Design and Evaluation Workshop presents to Agency personnel A.I.D.'s system of development project formulation and evaluation. This text is designed to serve as a resource both during the workshop and in the field.

After outlining the three steps in the A.I.D. project management process—planning (establishing goal and purpose), implementation (including interim evaluations), and final evaluation—the context of project design, including foreign assistance objectives and sample criteria for selecting from among alternative projects, is set forth. Against this background, the purposes of all A.I.D. project documents are explained and exemplified.

To help define development problems and identify feasible alternatives, the "development hypothesis" and "means-end analysis" are provided as aids in using the key element in project planning and evaluation—the Logical Framework (logframe). The logframe provides a narrative summary, objectively verifiable indicators, means of verification, and assumptions for

a project's goal, purpose, outputs, and inputs. The logframe is analyzed in detail and a sample matrix provided.

Next, the three types of project scheduling and implementation—bar and milestone charts and networks—are discussed. The network approach is deemed preferable because it is easier to prepare and provides more information.

Treated next are the three types of A.I.D. evaluations: regular (performed during projects), special (used when changes or unforeseen needs arise) and impact (assessing the extent of goals accomplishment). Detailed treatment is then given to data collection methods, including sampling procedures, questionnaire preparation, and statistical data analysis. The treatment of evaluations is completed with an explanation of A.I.D. evaluation procedures and organization, USAID evaluation review, and the Project Evaluation Summary (sample form provided).

A final section explains the process of obtaining information from A.I.D.'s Office of Development Information and Utilization. Practical pointers on writing survey reports and evaluating projects are included, and a list of common A.I.D. acronyms and a brief glossary of evaluative terms is appended.

059

PN-AAK-550

MF \$1.08/PC \$8.06

Managing rural development: peasant participation in rural development

Bryant, Coralie; White, L.G.

1980, 62p. : En

Although the vast majority of the world's poor are rural peasants, development planners have only very recently come to view rural development as the major goal of national development and recognized the centrality of peasant participation in the rural development process.

Tracing the evolution of the rural development concept from early emphasis on merely increasing production to recent integrated rural development programs geared toward raising rural incomes, the authors advocate "bottom-up" planning which emphasizes the expeditious flow of information from participants to planners. Hence, the planner must act as interpreter of community aspirations, strategist, infuser of values, decisionmaker, negotiator, organization architect, ambassador, and public spokesman.

Expressing participation as a function of anticipated benefits multiplied by the probability of their being achieved, the authors state that while collective action is socially desirable, collective effort is seldom individually attractive. To deal with this dilemma, they suggest that planners improve their listening and communication skills in order to heighten awareness of participants' preferences; change public into private benefits for participants (i.e., by restricting access to benefits only to participants or by exacting a fee from non-participants); and turn participation into a benefit rather than a cost (e.g., through use of social incentives). Specific management strategies are offered: (1) build on the peasants' primary goals; (2) think "small" and "simply"; (3) build on existing organizations and leaders; and (4) link local groups to external sources of support. As an alternative to the "bottom-up" approach, the authors suggest reforming and reorienting agricultural extension services.

Finally, in implementing decentralized projects, the authors caution planners against: reinforcing the power of local elites; fostering ambiguity in the roles and responsibilities of project staff and local leaders; allowing projects to cause undue



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competition among participating groups; and undermining local self-reliance. A 55-item bibliography (1930-79) is included.

060

PN-AAH-774

MF \$1.08/PC \$5.98

Tracing sex differentiation in donor agricultural programs

Staudt, K.A.

U.S. Agency for International Development, Bureau for Program and Policy Coordination, Office of Women in Development

1979, 44p. : En

Paper prepared for the American Political Science Association Annual Meeting, Washington, D.C., 1979

Women in developing countries are heavily involved in farm production, especially of food crops, and A.I.D. policy strongly supports that involvement. Through review of a comprehensive set of project documents, this paper explores problems in implementing that policy.

Studies show that women head one-third of the world's households, invest at least as much labor in agricultural production as do men, and commonly control the proceeds from their labor. However, because it is difficult to quantify women's participation (their products are usually used for home consumption, while men's products are most often marketed), the impact of agricultural programs on women is largely ignored. No more than a tenth of the projects reviewed mention women, and then the primary emphasis was on services such as food preparation, hygiene, and crafts. Project designers usually assume, erroneously, that heads of households are male and that males are primarily responsible for farm production and control all family proceeds. Not only do most projects focus on men, but they are implemented through programs largely staffed by men—this almost always restricts access by women to agricultural technologies, training, and credit. In fact, these programs, while improving production by men, often decrease the productivity of women (e.g., increased acreage plowed by men with modern technology entails a larger area to be hand-weeded by women). There is mounting evidence that failure to include women in production programs actually undermines those programs by reducing incentives for women to produce and by promoting home-bound activities instead.

A.I.D.'s Office of Women in Development (WID) was created to monitor project effects on women, but the system contains serious flaws: tracking system inadequacies prevent accurate data collection; local program administrators often do not understand their responsibility to evaluate the impact of programs on women; serious consideration of project impact on women is spottily, if ever, enforced; and standards measuring the contributions of women are omitted from evaluation criteria. The report's approach and supporting data are described in detail.

A 66-item bibliography (1960-79) and questions for discussion are included.

061

PN-AAJ-061

MF \$2.16/PC \$23.79

Rural women in Paraguay: the socio-economic dimension

Laird, J.F.

1979, 183p. : En

Spanish edition, 183 p.: PN-AAJ-062

932061600

AID-526-446

Rural Paraguayan women's participation in and contribution to the nation's economy have been greatly underestimated. This is the conclusion of the 1978 Socio-Economic Survey of Rural Women in Paraguay (FEMRURAL), the subject of this report.

FEMRURAL, conducted by La Direccion General de Estadistica y Censos with A.I.D. assistance, sought to generate baseline data on rural women's socioeconomic participation and contributions in order to improve rural development planning. The survey employed a questionnaire designed by La Direccion General, evaluated by various institutions engaged in rural activities, and distributed by Spanish- and Guarani-speaking female interviewers to 2,540 women who had primary socioeconomic responsibilities within their households. Women's personal characteristics (e.g., age, marital status, fertility, education) and family characteristics (e.g., family size, income, housing type) were compared to their socioeconomic behavior patterns in order to highlight differences between women-headed households (per capita income of \$156) and male-headed households (per capita income of \$290). Women's work activities are studied in terms of their participation in agricultural production and non-domestic work.

FEMRURAL revealed, among other things, that 54% of respondents' families are low income, the poorest ones being headed by women; 86% are economically active; 57% operate in several areas of the economy; and 78% do not use contraceptives.

The authors recommend that in the future, donors: (1) use data gathered in FEMRURAL to help understand and target specific components of the rural female population, particularly women-headed households; (2) offer supplementary income payments to the poorest women; (3) recruit women with high activity profiles as project participants and leaders; (4) design projects to focus on particular regions; (5) incorporate women in all livestock programs; and (6) design projects to lighten the workload of rural women.

The report is documented with 156 tables. Statistical measures of selected variables, a description of the urban sample, a guide to the use of FEMRURAL Archives, and a 56-item bibliography (1950-79) in English and Spanish are appended.

062

PN-AAJ-228

MF \$2.16/PC \$15.21

Keeping women out: a structural analysis of women's employment in developing countries

International Center for Research on Women

1980, 116p. : En

AID/otr-C-1801

Despite the undeniable need for women in developing countries to obtain gainful employment, the many restrictions imposed on female work result in unemployment, underemployment, and marginality of the women's labor force. This study analyzes the changing economic roles and responsibili-



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ties of women, women's contribution to national development, demand and supply constraints on the female work force, and the critical issues related to female employment and provides policy recommendations to enhance women's employment.

Changing developing country economic structures are breaking down traditional sex roles, giving women increased responsibility for supplementing basic survival needs of the family and primary responsibility for 23-30% of all households. Uni-dimensional views of women as wives/mothers and secondary workers are no longer accurate due to the critical need for women to contribute to household income. The real source of employment constraints for women are labor market discrimination and occupational restrictions caused by high unemployment among males, capital intensive modernization processes, and legislation "protective" of women. Thus, despite women's "double burden" of having to fulfill both maternal and worker roles, they can find employment only in the marginal informal sector, taking on exploitative, low-status, dead-end jobs which offer little remuneration or job security. These non-contracted jobs provide women with erratic earnings and exclude them from fair representation in paid labor. One exception to these marginal jobs is the labor market for women developed by "offshore" manufacturing of transnational corporations (TNC). Yet low pay, health problems, the instability of employment, restricted worker mobility, and the uncertain long-term viability of these firms make the appropriateness of TNC's as a strategy for promoting the female labor force questionable.

Recommendations for minimizing the constraints on women's employment, marginality, protective legislation, and "double burden" are offered, along with suggestions for promoting off-farm employment and more equitable TNC employment conditions. A 116-item bibliography (1969-80) in English, Spanish, and Portuguese is included.

063

PN-AAJ-229

MF \$1.08/PC \$6.37

The productivity of women in developing countries: measurement issues and recommendations

International Center for Research on Women
1980, 48p. : En
906000100
AID/otr-C-1801

By virtually ignoring household production and by undercounting female participation in the marketplace, labor force data consistently underrate women's contribution to Third World economies. As a result, policymakers resist the notion of women as economic beings. This report analyzes measurements of women's economic activities, discusses limits to these measures, and recommends improvements.

It is difficult to define women's household duties—by their very nature not performed for income—as productive or leisure activities. Domestic work, except when performed by paid servants, is excluded from most surveys. Many productive and income-generating activities are never valued since only primary job activities are reported in labor surveys. Also, because surveys are usually taken during slow farming times, rural women, who tend to be seasonal agriculturalists, are classified as nonworkers. In addition, religious and cultural biases often influence women to report themselves as economically non-productive. However, reliable data do show that women participate in both home and market production; women tend to work longer hours and have less leisure time than men; and including

home production, women's and children's contribution to the household is greater than that of men.

Among the author's recommendations to policymakers are: (1) expand the concept of economic activity to include the multiplicity of women's activities; (2) conduct studies to integrate data on women's household and marketplace behavior; (3) develop measures which portray shifts in the location of production from the home to the market; (4) design culture-specific measures; (5) identify the relationships between the age, fertility, marital, educational, and health status of female laborers; (6) initiate time use studies to identify inefficient home production activities and useful new technologies; (7) disaggregate and collect data on women's agricultural activities over a longer time span; (8) initiate complementary studies to identify the socioeconomic constraints to women's full-time wage employment; and (9) study women's underlying prejudices, motivations, and goals relating to work. A 47-item bibliography (1934-80) is appended.

064

PN-AAJ-556

MF \$1.08/PC \$9.23

Women in development: a selected annotated bibliography and resource guide

Vavrus, L.G.; Cadieux, Ron
Michigan State University. Non-Formal Education Information Center
MSU Annotated Bibliography, no.1, 1980, 69p. : En
931045300
AID/DSPE-C-0067

It is becoming increasingly clear that the costly efforts to integrate women more fully into the development process, e.g., by including nontraditional roles within the scope of women's activities, are often thwarted by long-standing cultural, political, social, and economic traditions. In response to the expanding literature on these issues and increased reader interest, Michigan State University's Non-Formal Education (NFE) Center has prepared this annotated bibliography to update a 1978 bibliography on women in development published in *The NFE Exchange*.

In the first of five sections, 167 items (1967-80) are listed and subdivided into two subsections. The first subsection lists publications having a general or global significance in the areas of general development, agriculture, food production, education, employment, work, family, nutrition, and health. The second subsection arranges references such as project reports, case studies, and specialized resource guides pertinent to specific geographical regions, i.e., Africa and the Middle East, Asia and the Pacific, and Latin America and the Caribbean.

The bibliography's second main section consists of an alphabetical listing of 47 women-oriented journals, newsletters, and periodicals, as well as 27 (1969-80) special issues of other periodicals addressing women's topics.

To provide more comprehensive access to women's literature, a third section lists 19 (1970-80) bibliographies which focus on specialized topics or geographic areas. These bibliographies, notes one of the compilers in her introduction, will help researchers and planners locate materials preceding the period emphasized in this present bibliography.

In the fourth section, 71 organizations dealing with women's issues—many of which, it is noted, disseminate up-to-date specialized information on women—are listed by geographic region of activity, i.e., international, Africa and the Middle East,



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Asia and Pacific, Europe and North America, and Latin America and the Caribbean.

The fifth and final section is an alphabetical listing of 53 (1976-80) recent acquisitions by the NFE Information Center.

065

PN-AAJ-696

MF \$1.08/PC \$10.01

Women's development projects and fertility change: suggestions for assessing field experience

Piepmeyer, K.B.

Pathfinder Fund Family Planning Evaluation Center

1980, 68p. : En

AID/otr-147-79-105

Recognition of the importance of socioeconomic factors as determinants of fertility has recently led both governmental and private family planning agencies to undertake community-level projects aimed at reducing fertility by enhancing women's socioeconomic status. This paper examines the rationale behind such socioeconomic strategies and offers recommendations with regard to their implementation and evaluation.

The following are examples of efforts to change the conditions associated with high fertility: improving women's health and ability to care for the health of their children so that high infant mortality rates will diminish; increasing the level of education among women in order to delay the age of marriage; opening up long-term employment opportunities so that women begin to balance out the rewards and recognition they receive for child-bearing with those for non-familial activity; and providing appropriate technology and other assistance to free women from domestic work and farm labor, permitting them to participate in educational and community activities.

Other mechanisms recommended to facilitate fertility decline include vocational training for girls and women, establishing cooperatives and marketing channels for women, providing maternity protection and child care, raising the minimum age at marriage, making education cost-free and compulsory, and passing equal rights legislation.

While there are indications that projects of this kind have a positive impact on the lives of the women participants, few such projects have been evaluated. The small size of the projects and the fact that they have been recently implemented makes evaluation difficult. However, because of their potential benefit, the author recommends the development of more flexible and innovative evaluation schemes so that project designers can clearly identify what does and what does not work in the field. Criteria and indicators for analyzing integrated projects are provided in chart form. A brief description of a field project in Kenya and a 28-item bibliography (1970-80) are appended.

066

PN-AAJ-772

MF \$1.08/PC \$7.15

Women's organizations: resources for development

Piepmeyer, K.B.

1980, 47p. : En

AID/otr-147-80-75

Women's groups are a uniquely effective means for promoting women in development (WID) activities. Against a background discussion of these groups' general development

potential and needs and of institutional resources capable of assisting women's groups, this report develops strategies and makes recommendations for donor assistance.

Factors as diverse as stereotyping men as breadwinners, excluding women's economic contributions from official statistics, and assuming that women will benefit from the trickle-down effect of a modernized society keep women's real and potential contribution to development largely invisible. Reversing this situation will require meeting women's key needs—expanding their productive capacity by developing appropriate technologies and childcare facilities and improving women's access to education, vocational training, and health care.

Although governmental institutions devoted to women exist in over 100 countries, their assistance depends largely on the effectiveness of intermediary non-governmental groups at the international, regional, and subnational levels, including women's groups themselves. The most effective intermediaries are those which are committed to development (not just to social welfare) and to women's causes and are well-managed and have access to country resources and government channels. Donors should assist these intermediary groups by: (1) providing them management training in such areas as fund raising, securing technical assistance, and monitoring activities; (2) providing grants for under \$5,000 and for the 5 years needed for a WID project to achieve self-sufficiency—contrary, in both instances, to donor policy; (3) helping groups gain political recognition by supporting them in publicizing women's issues; and (4) helping groups develop linkages in terms of resources and experiences at both the national and regional levels. Such donor assistance is best channeled to indigenous groups through international organizations such as the Associated Countrywomen of the World, the International Alliance of Women, and the International Council of Women; or through regional or national mechanisms, e.g., respectively, U.N. regional commissions and the Canadian MATCH organization.

A total of 25 specific recommendations are appended.

067

PN-AAJ-773

MF \$1.08/PC \$9.49

Women's organizations in rural development

Staudt, K.A.

1980, 72p. : En

Unless politically empowered, women will remain marginal in development and the unequal recipients of its benefits. Against a review of women's generally disproportionate political standing, this paper discusses organizational strategies to increase women's political participation in developing countries.

Conventional measures such as voting, recognition by development agencies, and active party membership reveal women's meager political involvement, as does the absence of female leadership of and adequate representation in political and bureaucratic activities. Strategies to reverse this situation—strategies which are needed even in countries professing "emancipationist" ideologies—must take into account the type of political system. Women's political prospects increase to the degree that the system recognizes organizational, as opposed to socioeconomic, status as the basis for political activity and incorporates independent groups into the decisionmaking process. Economic and social incentives (e.g. income-earning projects and collective causes) are key means of helping women organize to satisfy both immediate and—if programs are well managed—long-term needs. Although male/female organizations are ideal, sex-based strategies can help women



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develop skills needed to gain leverage in integrated mainstream groups. Long-term group effectiveness can be thwarted, however, by submersion into larger political structures; the rise of upper class women group leaders; and counterproductive external intervention (e.g., cultural imposition). If development projects become sensitized to sex, class, and distributional effects, more self-sustaining women's projects will have a chance.

Sixteen policy recommendations, based on the above analysis, are made regarding organizational strategies, employment/institutional strategies, and data collection. Key recommendations include financing women's organizations, e.g., through PVO's; providing incentives for official bureaucracies to employ women; and collecting pre-and post-project data on women's groups. A 119-item bibliography (1955-80) is appended.

068

PN-AAJ-774

MF \$1.08/PC \$6.50

Various perspectives on using women's organizations in development programming

Hoskins, M.W.

1980, 33p. : En

AID/otr-147-80-45

Indigenous women's organizations can be effective intermediaries between donors and developing country women in implementing women in development (WID) projects. This paper summarizes discussions held at a series of A.I.D. conferences on this potential and discusses ways to make it a reality.

Four major conclusions were reached at the conferences about the potential of women's groups. (1) Strengthening local women's user groups will help donors reach the poor through local projects and the channeling of funds and materials. (2) Working through these organizations provides women with opportunities for personal and managerial development. (3) Women are under-represented in development programs and need help in establishing strong and effective organizations. (4) A number of women's groups are ready to participate in development programs, but how donors can assist them to do so remains unclear. Informal groups, it was felt, can best be supported by giving them information and by assisting local projects around which groups form. Intermediary groups should be encouraged to provide information at the local level, establish networks, and offer expertise on larger programs, while non-indigenous groups can provide technical support.

The author then provides two criteria for WID projects—to integrate women into all aspects of development, especially in the modern sector, and to give them more control over their future by improving their skills—and suggests ways for improving the use of women's organizations in achieving WID objectives.

It is recommended that user groups make sure that projects they support truly benefit women and push for women's interests in larger projects; that intermediary groups establish an umbrella fund for small WID projects, hold a year-long regional workshop to build up the capacity of local women to work with development programs, and assist promising local groups; and that donors help define goals and evaluation criteria and fund research on training, income generation, marketing, technical support, and case studies.

A 53-item bibliography (1974-80) and an appendix on selected non-indigenous intermediaries representing six different organizational frameworks is included.

069

PN-AAJ-775

MF \$1.08/PC \$5.46

Evaluating small grants for women in development

Helzner, J.F.

1980, 35p. : En

AID/otr-147-79-43

To assist donors considering funding small grants (\$500-5,000) for women in development (WID) projects, this paper develops a framework for evaluating the potential effects of such projects. The projects in question are defined by the author as projects in which women themselves control the funds, plan the activities, and decide on the division of labor and which exist as part of a larger program cluster of small grants.

The basic objective of WID grants and programs is to make women participants in and beneficiaries of development. Specifying this objective entails several problems: the need to distinguish between tangible and intangible benefits and between general development and WID objectives; the need to make project activities concrete and measurable; and the very smallness of the grant, which may make it simply not worthwhile to collect evaluative data. A review of current efforts to evaluate both general development and WID projects leads to the conclusion that evaluative criteria should be based on a careful selection of objectives that are meaningful to women in the development field and applicable to small grants.

The author then distinguishes between various types of women's groups which are likely to receive small grants—"elite groups" (educated, 'usually urban, relatively wealthy women who gather to fulfill social needs) and "local groups" (rural or urban women who group together to meet daily subsistence needs)—and proposes five criteria for measuring the development effect of small grants on these groups. (1) Is the group personal-or task-oriented? (2) Is it devoted to self-help or social welfare? (3) Does it recognize itself as a formal unit? (4) Does it depend on outside motivation? (5) Is the group an end in itself or a means of achieving WID objectives? Standard evaluation methods can be adapted to these criteria through before-and-after comparisons, regular reporting during the project, case studies, and "exchange of experience" workshops. Other adaptation methods include comparing individual grants and assessing the program as a whole.

A 30-item bibliography (1967-79) in English and Spanish is appended.

070

PN-AAJ-894

MF \$1.08/PC \$9.88

The role of rural Haitian women in development

Smucker, J.N.

1981, 76p. : En

521000000

AID-521-C-0145-T

To help promote development in Haiti while avoiding the deterioration of women's status that development based on developed country norms often entails, this study profiles Haitian rural women and suggests suitable assistance strategies.

A description of the socioeconomic setting of Haitian rural women highlights traditional values—the importance of marriage (legal or customary) and children and the authority of the



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husband. To show the involvement of Haitian women in commerce, their predominant economic role, sketches are provided of marchandés (market ladies) in different regions. Marchandes sell their own produce or, more frequently, travel to country markets where they buy large quantities to resell wholesale in the cities. These activities may be threatened by the recent road network expansion if there is a shift to bulk cargo transport. Women also participate in charcoal production, kitchen gardens, harvesting, and raising small animals. Although non-farm employment opportunities for Haitian women are very limited, they do exist and include gravel making, cassava making, commercial weaving, factory jobs, salt collection, castor oil production, handicrafts, domestic service, prostitution, the roles of midwife and witchdoctor, and home industry (e.g., seamstress).

A major constraint on women's employment options is the lack of a system to teach women the skills needed for economic advancement. Women have benefited from "Food for Work" programs run through community councils (one of the few successful community organization efforts in Haiti).

The author recommends assistance strategies for women that focus on: (1) agricultural insurance credit to increase production of internally marketed produce and increase women's involvement in commerce; (2) making seed available for kitchen gardens; (3) French language instruction; (4) home industry expansion; (5) cooperatives based on the extended family; (6) markets for handicrafts; (7) teaching women new trades or skills, which they are enthusiastic to learn; and (8) women's primary needs and traditional values. A 44-item list of references (1940-81) is included.

071

PN-AAJ-919

MF \$1.08/PC \$8.71

Limits to productivity: improving women's access to technology and credit

Schumacher, Lisa; Sebstad, Jennefer; Buvinic, Mayra
International Center for Research on Women
1980, 67p. : En
906000100
AID/otr-C-1801

Although increasingly responsible for the family's economic welfare, women tend to be denied access to new technology and credit, relegating them to low productivity levels, low status, and poor paying jobs. This paper analyzes constraints on women's access to technology and credit and offers recommendations for improving their position.

The co-existence of the traditional/subsistence sector of food production and domestic care, primarily undertaken by women, with a large scale modern sector is a major constraint to women's access to technology. Men's involvement in the cash economy and the exclusion of women contributes to increased female-headed households and lowered women's status. A second constraint is women's lack of economic leverage through capital, land, or credit, to effectively demand new technology. A third constraint is the targeting of men as the producers of cash crops in rural technology transfer programs, while designing for women family welfare or economically marginal programs which emphasize their role as mothers rather than as producers. The fourth constraint is the lack of recognition given to women in national technology acquisition policies. Thirty-three recommendations for improving women's access to technology at the national, rural, and urban levels

stress government incentives for hiring, financing, and training women and establishing cooperatives and extension services.

Women receive credit through informal systems (e.g. relatives) due to constraints in the formal borrowing system which include skewed resource concentration, supply allocation problems, limited demand for formal credit by the poor, high borrowing and transaction costs, lack of collateral, and social customs (e.g., need of husband's approval). Examples of credit projects which meet women's needs (India, El Salvador) are given along with 14 recommendations stressing the need to incorporate women's concerns and activities into the design of credit programs while facilitating group lending and minimizing transaction costs for women.

A 76-item bibliography (1962-80) is appended.

072

PN-AAJ-932

MF \$3.24/PC \$28.34

Health needs of the world's poor women

Blair, P.W.
Equity Policy Center
(International Symposium on Women and Their Health, Port
Deposit, MD, US, 8-11 Jun 1980)
1981, 218p. : En
931000300
AID/DSPE-G-0071

The International Symposium on Women and Their Health (ISWH) brought together advocates of women's health with primary health care professionals. This volume of 50 papers presented informally at the ISWH is divided into eight sections to address the extent to which current health care systems respond to the special health needs of poor women in the developing world.

The first section surveys women's health problems, especially neglected aspects of women's health such as sexually transmitted diseases and the consequences of domestic violence. The next section treats women's vulnerability to malnutrition given the combination of heavy work loads with childbearing and lactation. Cultural patterns that allow girls to be weaned earlier than boys and limit their food consumption further contribute to high mortality rates, anemia, the "maternal depletion syndrome", and underweight, sickly children. A third section describes how women in the United States, particularly racial minorities, have many of the same concerns as women in developing countries, including access to rural health care and safe, legal abortions; mental stress; and teenage pregnancies. The fourth section addresses the problems of providing health services to women in remote rural areas. An increase in convenient curative care, including family planning services and supplies, and income-generating opportunities that will increase women's mobility and self-respect are needed.

Other sections discuss women's need for clean, safe water and sanitary conditions; the need to enlighten health care providers as to the needs of women; national and international health strategies; and current experiments in community health projects. Major themes include the need: (1) to take into account the constraints on women's time and mobility and the sociocultural inhibitions that minimize women's access to health services; (2) for women-to-women delivery systems and the critical importance of programs that give women the confidence as well as the cash to seek adequate health care; and (3) to go beyond current hospital based, urban oriented health systems.



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A bibliography is appended to each section. Summaries of the five ISWH workshops and a listing of ISWH participants and contributors are also appended.

073

PN-AAK-439

MF \$2.16/PC \$18.07

African women in development

Jeffalyn Johnson and Associates, Inc.
1980, 139p. : En
698013500
AID/afr-C-1629

While the design and implementation of women in development (WID) projects are flawed, these innovative projects do conform to A.I.D. mandates and with modifications are replicable. So concludes this study of seven small-scale WID projects involving vegetable production and women's workload in Senegal, day care in Ghana, the cloth industry in Sierra Leone, and studies of the vegetable tannin and silkworm industries and of the role of women in Upper Volta.

Regarding the projects' designs, in many cases outputs were not quantified, goals and purposes were unrealistic, feasibility studies (when conducted) were ignored, baseline data were inadequate, and input from the target population was insufficient. Implementation was often marred by the inadequate, inappropriate, or untimely arrival of inputs; by a shortage of project management skills; and by spotty participant involvement and host government support. As a result, patterns of achievement were inconsistent. Significantly, there is no evidence that the projects altered the traditional attitudes of local men. External problems common to all the projects included drought, illiteracy, and weak national economies.

The author recommends that WID projects requested by potential beneficiaries to meet a specific need be adequately developed and funded, but that multi-sector WID projects be integrated into larger rural development programs. Further, WID project designs should: include feasibility studies of the project's impact and realistic outputs, purposes, and goals; be allotted adequate time and money; and contain plans for interim and final evaluations. Effective implementation necessitates delivery of needed inputs; monitoring of outputs, external factors, and potential problems; involving beneficiaries (including men) in project operations; and soliciting the support of host governments. Finally, evaluators should use both quantifiable and soft (subjective) data and should be allowed sufficient time for their task.

Appended are separate evaluations of the seven projects.



Although policymakers have resisted the notion of women as economic beings, these women pounding millet in Niger and millions of other African women produce most of that continent's subsistence food supply.

074

PN-AAJ-674

MF \$2.16/PC \$13.91

An assessment of the macroeconomic policy framework for employment generation in the Philippines

Hooley, Richard
1981, 103p. : En

Due mainly to low industrial productivity, the Philippine economy has been unable to absorb a 4.6% annual growth in the labor force, causing wages to decline 25% and 35% in urban and rural areas, respectively. This paper assesses the macroeconomic policy framework as it affects employment and income generation and proposes guidelines to link the USAID/P assistance strategy to the current package of World Bank-sponsored reforms for industrial employment.

Industry has expanded at only a modest rate in recent years and has remained capital-based in production and organization. Out of an average annual increase of 600,000 in the labor force, only 10% find jobs in manufacturing. The World Bank's industrial restructuring program attacks these problems by expanding light-manufactured exports, reducing tariffs for import-substituting industries, and reforming the fiscal incentive program which favors capital-intensive production. The net effect of the entire package, according to the author, will be to raise the share of manufacturing employment in total employment from the present 11% to about 14%.

Among the recommendations for raising manufacturers' share of employment to at least 16% by 1985 are: (1) link the proposed light-manufactured exports to domestic industry to increase the likelihood of secondary employment effects; (2) increase the role of the Philippine Labor Ministry in the economic planning process to improve labor relations between government and labor leaders; (3) make domestic industry more efficient by establishing a center to study productivity trends and assist individual firms to improve their operating procedures; (4) devote productivity gains to expansion of employment rather than to consumption or increased wages; and (5) strengthen policies to improve the rural share of labor.

Included are six appendices related to wage and employment trends in the Philippines.

075

PN-AAJ-900

MF \$1.08/PC \$11.57

A study of economic evaluation procedures for population-related projects

Robinson, W.C.; Schutjer, W.A.
American Public Health Association
1979, 88p. : En
932087700
AID/pha-C-1100

Lack of clearly quantifiable benefits makes economic evaluation of population-related projects (PRP's) difficult. This report reviews the problems involved and proposes operational procedures to overcome them.

Discussion is given in turn to: (1) PRP's macroeconomic benefits (increases in per capita income and consumption) and microeconomic benefits (enabling individuals and societies to meet fertility goals); (2) PRP's direct outputs (provision of contraceptive services and efficient use of them) and indirect outputs (activities to provide knowledge of contraception and/or effect attitudinal changes towards it); (3) methods to

evaluate the impact of these outputs on fertility reduction, including short-cut methods such as the couple-years of protection (CYP) method and more detailed analytical methods (none of which are wholly precise, since no contraceptive is 100% effective); (4) the need to distinguish short and long-term PRP benefits given the limited 3-5 year time-frame of most PRP's; and (5) the impact of projects having only indirect and long-term, but nevertheless real fertility effects, e.g., land reform projects.

The following conclusions and recommendations are offered: (1) The socioeconomic benefits of PRP's can be evaluated by using projections of the multi-sector impact of population growth and by using existing models to quantify the economic benefits of reduced fertility. (2) Direct PRP outputs should be measured through direct indices, such as CYP's; other indices can be devised for indirect outputs. (3) The differing impacts of direct or indirect PRP outputs should be taken into account. (4) Land reform, nutrition, and education projects affect fertility indirectly by motivating prospective acceptors. (5) At the project level, it is better to measure outputs in terms of the project itself, e.g., satisfying an unmet need for contraception, than in terms of births averted or ultimate socioeconomic benefits. (6) Noneconomic indicators of PRP impact, which are the best qualitative indices for most projects, should supplement routine economic analyses.

Included are a 29-item bibliography (1965-80) and an appendix containing models quantifying economic benefits.

076

PN-AAJ-982

MF \$3.24/PC \$25.61

Poor rural households, technical change, & income distribution in less developed countries: a summary report of findings from West Africa, Southeast Asia, and Brazil

Michigan State University. Department of Agricultural Economics

Cornell University. Department of Agricultural Economics
Purdue Research Foundation
1980, 197p. : En

Related studies: PN-AAH-889, PN-AAG-936
931059400

AID/ta-C-1328

To help solve the riddle of why many developing country farmers continue to live in abject poverty while new farm technology is steadily increasing aggregate farm output, this report summarizes and compares studies conducted in selected sites in West Africa, Southeast Asia, and Brazil on the use of new farm technology and its impact on the rural poor.

The basic results of the three studies are as follows: (1) Income increases in West Africa have been modest due to removal of subsidies for technical improvements, but were substantial in the Philippines, although mechanical threshers directly displaced the labor of the landless and near-landless. Brazil showed a potential for increased income given adequate credit and extension. (2) High short-term input costs, perceived risks of change, inadequate extension services, and product price inelasticity all significantly constrained adoption of modern technology by small farmers. In Southeast Asia, there was a sharp contrast between what was feasible experimentally and what was commercially profitable. (3) As to resource use efficiency, land and fertilizer were significantly underused in Africa due to societal land use restrictions which placed land costs below production value. Small farmers in Asia generally

used labor more efficiently than did large farmers and practiced intercropping widely, although they rarely achieved optimum crop combinations. In Brazil, both landowners and tenants underused capital, but owners tended more to lack labor and tenants land. (4) Because educated workers dominated rural-urban flows and were more successful than the noneducated in finding urban jobs, income disparities between rural and urban areas tended to widen in all areas studied. Brazil was the most efficient in allocating labor both within and among sectors. (5) Poor farm women worked to supplement subsistence farm income, in Africa and Asia taking on menial jobs to free men for higher paying but less secure jobs. (6) Most household expenditures of the poor are for food. In Africa, the poor consume more than they can grow, so that grain price increases will worsen income inequality. In Northeast Brazil, consumption expenditures declined as income rose.

Bibliographies totaling 112 references in Spanish and English (1957-79) are included.

077

PN-AAJ-983

MF \$1.08/PC \$4.42

Zimbabwe: current economic conditions

Wolgin, Jerome

U.S. Agency for International Development. Bureau for Program and Policy Coordination. Office of Policy Development and Program Review. Economic Development Division
1981, 35p. : En

The majority rule Government of Zimbabwe (GOZ) has inherited a dualistic economy with sharp income and commercial enterprise disparities between blacks and whites. This paper reviews current economic conditions in Zimbabwe against the background of the GOZ's efforts to redress these inequities while at the same time promoting economic growth.

The GOZ's economic reconstruction strategy is a complex one of: (1) maintaining traditional policies toward the modern economy; (2) investing in the reconstruction of tribal trust lands reserved for blacks while settling black farmers from those lands into underutilized areas of the commercial sector (which is usually reserved for whites); and (3) expanding government services, especially health and education, to blacks. The most pressing immediate need is to expand employment by 50,000 jobs per year and increase investment which has been constrained due to the limited availability of foreign exchange and lack of investor confidence. While a conservative policy towards imports has kept the country's balance of payments relatively strong, the surplus has rarely covered burgeoning GOZ expenditures required by its reconstruction strategy and by its reorganization of the national security force. Although the alarming budget deficits that have resulted cannot, given the current political climate, be reduced by raising taxes, it is hoped that financing for the ZWD 515 million 1980/81 and anticipated ZWD 600 million 1981/82 deficits will be forthcoming from the private sector and the International Monetary Fund. Devaluation of the Zimbabwe dollar does not currently seem advisable.

The author concludes that, to achieve its long-term reconstruction goals, the GOZ must attempt in the near term to instill confidence in the domestic and foreign business communities and in the black majority. A.I.D. has responded to the GOZ's growth with equity program by providing direct assistance to: (1) help Zimbabwe overcome its macroeconomic problems; (2) alleviate transport and manpower constraints; and (3) to raise the income of the poor by increasing agricultural productivity,

employment, and social services. Fifteen statistical annexes containing basic economic data are appended.

078

PN-AAK-026

MF \$2.16/PC \$20.02

Costos de produccion de cultivos temporeros 1980 (Costs of production of annual crops 1980)

Dickey, Thomas M.

Colorado State University. Department of Economics
CSU Occasional Paper, no.5, 1981, 152p. : Sp
931113401
AID/ta-BMA-6

In 1980, the Dominican Republic's Secretary of Agriculture (SEA), in conjunction with the country's Agricultural Development Bank (Bagricola), adopted a new methodology for recording annual crop production costs in order to improve the country's agricultural credit policies. This report describes this methodology and presents the actual production cost data for 1980 in both record book and summary form.

As envisioned by this methodology, production cost data is collected through direct farmer interviews and recorded on single page entries in a record book. Farmers are asked to specify the individual production tasks for particular crops, such as preparing land, applying inputs, seeding, weeding, and harvesting. For each task, data are collected on the month of activity, amount of task completed (i.e., how many seeds were planted), unit of input (gallons, laborers per day), value per unit, and total task cost. In addition, crop varieties are specified, yields are determined, and costs per unit are calculated. For classification purposes, an 8-item code is assigned to each record to identify the SEA region in which the farm is located, the type of crop cultivated, the seeding and watering (irrigation) techniques used, the level of input use (none, low, medium, and high), the system for preparing the land (manually, with animals, or mechanically), the productive capacity of the land, and whether a crop requires any special technology package, e.g., mechanical collection for a given grain.

To create a viable and representative picture of farm production data, the farmers interviewed should cultivate those crops deemed most important to the regional or national economy; use technology packages most common in the area; cultivate a medium-sized plot of land; and be able to record solicited information reliably and accurately.

In addition to actual production data for 1980, included are interviewing directions and guidelines and instructions on how to tabulate collected data and make required calculations.

079

PN-AAK-028

MF \$1.08/PC \$10.66

An experiment with farm recordkeeping in the Dominican Republic

Tinnermeier, R.L.; Dickey, Thomas M.

Colorado State University. Department of Economics
CSU Occasional Paper, no.8, 1981, 82p. : En
931113401
AID/ta-BMA-6

Farm records detailing the history of a farmer's operation are widely used in developing countries to provide data for farm and sector analysis and for loan evaluation. This study de-

scribes an experiment to introduce farm record keeping to small farmers in the Dominican Republic (DR).

The record book used in the DR consisted of single pages for recording data on all the work activities, purchases, uses of inputs, sales of products, etc., for each crop or enterprise. While resembling the forms used in a similar experiment in Honduras, the DR forms differed in that they were organized for ease of data entry and for direct use in preparing farm enterprise budgets. Data for whole-farm analysis was not provided by the DR records. To implement the experiment, an interviewer was hired to help farmers with the recordkeeping process, and 11 farmer participants were chosen from a list provided by the extension agent. The resources of the participants were inventoried, and the interviewer periodically visited the farmers throughout the growing season to help them record the data. The problems encountered regarding the latter included non-uniform measures used by farmers; non-recording of home consumption of crops grown or of crops given to friends; the difficulty of separating tasks performed by hired labor; farmers' failure to distinguish between gross and net income; and the difficulty in measuring time required of the farmer for supervising contract labor.

The experiment had several implications. (1) Although the need for an interviewer makes recordkeeping a very expensive, their use has definite advantages over single visit interviews in generating data for credit decisions. (2) Successful use of recordkeeping requires a trained and experienced interviewer and farmer participants who are competent and motivated. Tying recordkeeping to credit provision is one of the strongest motivating causes. (3) recordkeeping is a viable tool for educating small farmers about productivity and efficiency.

Included are brief socioeconomic profiles of participating farmers, experimental data, and a 10-item bibliography (1977-80).

080

PN-AAK-032

MF \$1.08/PC \$5.98

Developing farm enterprise budgets: an experiment in the Dominican Republic

Tinnermeier, R.L.; Dickey, Thomas M.

Colorado State University. Department of Economics

CSU Occasional Paper, no.6, 1981, 46p. : En

931113400

AID/ta-CA-3

The general inadequacy of existing farm enterprise budgets within the Dominican Republic's (DR's) agricultural sector led to the design of a new, standardized, interinstitutional budget system for use by the Agricultural Development Bank and the Secretariat of Agriculture's Farm Management Division. This study describes this new budgeting methodology and provides guidelines for its replication in other countries.

Direct farmer interviews were used to collect agricultural production data because they proved more accurate than the estimates made by bank credit agents; because bank credit agents were available to do the interviewing; and because they provided an opportunity to specify farming technology and increase budgets line-item detail. Initially, the information collected was limited to variable production costs of single harvest crops, excluding fixed costs, product prices, perennial crops, intercropping, and livestock enterprises. A budget code was assigned to identify the crop and any special crop characteristics; the area of applicability; the planting, watering, fertilizing, and land preparation techniques; the harvest month; and

the source of data. Farmers were then interviewed for data on crop varieties, yields, unit costs, standard work day and wage rate, and variable production costs by line item in order of production activity.

To create a representative picture of farm production data, the farmers interviewed should cultivate crops vital to the regional economy; use technology packages most common in the area; cultivate medium-sized plots; and be able to record solicited information reliably and accurately. A minimum of five interviews are required. Detailed interview and tabulation procedures are also included.

In replicating this farm enterprise budget system in another developing country, particular attention must be paid to selecting the institution and the office that will be responsible for the budgets, assessing the agricultural sector's demand for a more sophisticated budgeting process, and assessing the capabilities of the budget office.

081

PN-AAK-033

MF \$1.08/PC \$12.09

Analysis of three methodologies for collecting data from small farmers in the Dominican Republic

Longwell, J.D.

Colorado State University. Department of Economics

CSU Occasional Paper, 1981, 93p. : En

931113400

AID/ta-CA-3

In preparing investment plans for small farmers, credit agents for the Dominican Republic's Agricultural Bank often estimate small farmer production costs using secondary sources such as informal surveys of area input suppliers.

To determine the objectivity of Bank estimates, an alternative method of data collection, based on interviews with small farmers themselves, was tested in the Cibao Valley and the results compared with estimates prepared by Bank agents. Two samples were interviewed: (1) a representative (purposive) sample of five farmers chosen by Bank agents was interviewed about land market value, labor, input prices, and level of technology; and (2) a random sample of 30 farmers was similarly interviewed.

A comparison of the data collected indicates that credit agents' estimations vary significantly from the production cost data provided by farmers in the interviews. Little difference in data was noted between the two samples. Consequently, by estimating production costs instead of systematically measuring them (through questionnaires), the Bank is not accurately representing actual production costs faced by its farmer clients. The consequences of under- and over-estimating production costs (no consistent pattern was noted) in the farm investment plan can affect, respectively, a farmer's ability to repay loans and the Bank's marginal productivity. This translates into nonviable and ineffective agricultural credit policies. No significant administrative cost differentials existed between the two surveys, indicating that either one would be feasible and more reliable than mere estimates. Perhaps the most significant contribution of the present study is, however, that it stressed the importance of adequate training and supervision of the data collectors.

Appended are a 41-item bibliography in English and Spanish (1953-80) and survey data.

082

PN-AAK-034

MF \$2.16/PC \$13.91

Collection of farm production data for credit programs in developing countries

Tinnermeier, R.L.; Dickey, Thomas M.; Longwell, J. D.
Colorado State University. Department of Economics
CSU Occasional Paper, no.7, 1981, 107p. : En
931113400
AID/ta-CA-3

Farm enterprise budgets and farm records are two sources of farm production data which can significantly help developing country credit agents make sound credit decisions on existing or potential borrowers. This study reviews these two data sources in Honduras and the Dominican Republic (DR) and suggests ways to improve their use and extend that use to other developing countries.

Enterprise budgets provide data on agricultural production inputs enabling credit institutions to set loan limits and withdrawal and repayment schedules. In both Honduras and the DR, it was found that enterprise budgets lacked uniformity; ignored regional differences, lacked sufficient detail, and relied on inaccurate data derived from field personnel estimates. To rectify these problems, field testing of alternative methodologies revealed that institutional responsibility for budgets should lie in a single office; that direct farmer interviews were much more reliable and detailed data sources; that involving field personnel in designing and preparing enterprise budgets ensured staff cooperation in the implementation phase; and that adequate supervision of interviewing and budget preparation is needed to assure data quality.

Farm records, in turn, are histories of farmers' operations, and provide data on production costs and returns, input use, efficiency levels, and inventory changes. They are often prepared for whole-farm and agricultural sector analysis which is seldom performed in developing countries. Furthermore, farm records are expensive to prepare because they are so comprehensive and require considerable staff training. The interviewer must be diligent, reliable, and competent, and farmers must be capable and willing to participate and keep accurate records. Farm records are valuable educational tools, however, for teaching farm management to both farmers and credit agents. For use of these data methods in other developing countries, a single institution should be solely responsible for their preparation and performance, and the agricultural sector's demand for a more sophisticated budgeting process should match the capabilities of the budget office.

A 48-item bibliography (1953-81) in English and Spanish is appended.

083

PN-AAK-037

MF \$2.16/PC \$17.94

Agrarian reform, agricultural planning, and economic development in Peru

Timmons, J.F.
Iowa State University. Department of Economics
ISU International Studies in Economics Monograph, no.13,
1981, 139p. : En
527006000
AID/lac-C-1069

From 1961 to 1977, A.I.D. funded four contracts with Iowa State University and Iowa University to provide technical assistance, training, and research to further Peru's agricultural and

economic development. Each contract, the experiences and accomplishments of which are summarized in this report, emphasized training Peruvians to become self-sufficient in development planning and conducting research relevant to Peruvian development issues.

The first contract analyzed agrarian reform's economic and legal aspects and the conditions necessary for its implementation. Three major avenues were studied—increasing nonfarm employment opportunities; extending cropland through irrigation, clearing, drainage, and colonization; and shifting land ownership from large holders to Indian colonos—and three prerequisites for progress were identified—the provision of capital and technical assistance and the enactment of institutional changes.

The Iowa universities were then asked to develop a nationwide agrarian reform and credit program to increase agricultural production and improve the rural population's (especially Indians') standard of living. Methods of land valuation and legal and land potential studies developed under this second contract contributed significantly to the 1963 Peruvian agrarian reform.

The third contract, negotiated after a military coup in 1968, called for improving Peru's capability to conduct economic planning research and insuring the prompt incorporation of such research into government planning, programming, budgeting, and evaluation. Ensuing work focused on agricultural sector analyses, water law and administration, farm management assistance, and statistics assistance.

In the final contract, the Iowa universities assisted the Ministry of Agriculture in analyzing key problems (e.g., productivity and welfare of small rural producers) and in improving Ministry's methodology and implementation capacity.

Among the authors' recommendations are that: (1) A.I.D. continue to help universities serve the needs of developing countries; (2) universities make their training more applicable to developing country situations; and (3) developing country students who receive U.S. training be encouraged to return to their native countries. A list of program publications is among the five appendices.

084

PN-AAK-118

MF \$4.32/PC \$47.97

Trading with the Third World: experiences of AMO's in Europe and the U.S.; final report

Beardsley, J.R.
Center on Technology and Society
New Transcentury Foundation
1981, 359p. : En
931003000
AID/otr-C-1805

Alternative marketing organizations (AMO's) are trading and educational organizations which seek to help developing countries by importing their handicrafts and food commodities and by designing educational programs on Third World conditions and international trade and development. This report describes and assesses the performance of AMO's both in Europe and the United States.

In principle, AMO's strive to pay fair wages to suppliers; be informed of suppliers' socioeconomic conditions; favor intermediary organizations to help suppliers organize and avoid marketing products which might be environmentally adverse; choose suppliers whose products cannot be sold through commercial channels; and re-invest profits into educational

programs. AMO's also encourage suppliers to develop local markets instead of depending exclusively on exports. Although the handicraft market expanded rapidly in the 1970's, real growth has dropped over the past several years and it is questionable whether the few existing AMO's can market enough new products while maintaining commitments to old suppliers.

The most common problems AMO's have with suppliers include low quality goods, late deliveries, poor packaging, mislabeling, lack of documentation, failure to act upon marketing information, and high prices. Suppliers, in turn, complain that AMO's fail to supply reliable market information, to remit profits on schedule, and to fully understand suppliers' constraints. Although having only a small impact on export market-

ing, AMO's have demonstrated that altruism and commerce can be successfully merged, but that there is also a need for strong entrepreneurial leadership, a flexible and diverse marketing structure, and inter-organizational cooperation to maintain high sales levels.

The authors recommend that A.I.D. finance existing suppliers and explore the feasibility of establishing a U.S. capacity to address suppliers' needs for information, market contacts, promotion, and technical assistance.

Appended are 27 AMO case studies, summaries of A.I.D. export development projects, a survey of the experience of U.S. PVO's in export marketing along with recommendations for future PVO involvement, and a 35-item bibliography (1966-80).



085

PN-AAJ-034
MF \$1.08/PC \$9.23

The sociolinguistic context of literacy programs: a review of non-formal adult literacy programs in AID

Hoben, S.J.
1980, 69p. : En
AID-147-PE-70

While the world's literacy rate increased from 55.7% to 64% from 1950 to 1980, the estimated number of illiterate people rose during the same period from 700 million to 814 million. Despite A.I.D.'s mandate to promote literacy among the rural poor and disadvantaged minorities within developing countries, A.I.D. has done relatively little in this field. So says this study, prepared to help A.I.D. design and implement effective nonformal education (NFE) literacy programs.

The following conclusions were reached. (1) Not all literacy projects have to be NFE teaching projects; language planning assistance, expanded elementary education, and minority language publication all contribute to increased literacy. (2) The motivation of beneficiaries depends largely on whether the language of instruction is useful to them, i.e., whether they know or can easily learn the language and have access to material published in it. (3) Choice of language must take into account both host country policy and local use. (4) This choice should be made on a case-by-case basis with sociolinguistic information incorporated into any decision.

The study recommends that A.I.D. broaden its literacy programs to include elementary education projects and support for language planning and for publishing in previously unwritten languages. A.I.D.'s country planning should incorporate sociolinguistic information about language distribution, communicative functions of languages, and social patterns of language use. As part of project identification, A.I.D. should assess the need for literacy in the target area's economic development, the language use of various social groups in the target area, and the appropriateness of the project given the area's literacy climate. Finally, in project design, A.I.D. should carefully consider which language to use when teaching literacy, the developmental stage of a nation's writing system, and the match between teaching methods and the type of writing system.

A 37-item reference list (1953-80) is appended.

086

PN-AAJ-119
MF \$3.24/PC \$29.25

Characteristics and needs of out-of-school youth

Kahler, D.W.; Droegkamp, J.M.
1980, 214p. : En
931124100

The inability of the formal school system in developing countries to keep pace with rising population growth has led to increasing numbers of out-of-school youth unprepared to participate in the development process, thereby retarding the process itself. This paper analyzes the characteristics and needs of out-of-school youth in developing countries and proposes priority recommendations for A.I.D. assistance.

Out-of-school youth fall into three main categories: those who have had no access to schooling; those who dropped out without completing a specified or expected level of schooling;

and those who completed a certain stage, such as primary, but who have not continued onto the following stage. A profile, illustrated by tables, is presented for the out-of-school youth population in terms of enrollment, literacy, participation in out-of-school youth programs, place of residence (rural or urban), employment, and sex.

The needs of this youth population for employment, training and educational opportunities and for sociopolitical participation are analyzed, along with traditional project responses to these needs. Nonformal education (NFE) programs have often been the most appropriate response because of their ability to link skills development with youth's realistic needs while being the most adaptable to local needs, trainee schedules, and changing conditions.

It is recommended that A.I.D. concentrate, in its NFE and Out-of-School Youth Project, on the needs of rural youth and of female dropouts and on incorporating entrepreneurial and managerial skills into training programs. The authors conclude that all programs must give full consideration to the need for more active participation of out-of-school youth in program decisionmaking, implementation, benefits, and evaluation.

Appended are country-specific illiteracy rates for the 15-19 age group in 20 developing countries, a review of various rural NFE programs, a review of two entrepreneurial and management skills training programs, and a 155-item bibliography (1969-80) in English and French.

087

PN-AAJ-920
MF \$2.16/PC \$15.99

Report of an engineering manpower survey of Malawi

Louis Berger International, Inc.
1979, 124p. : En
612020100; 698013530
AID/afr-C-1132

Malawi's shortage of trained engineering personnel—engineers, "diplomates", and technicians (EDT)—will reach a critical point by 1983. This report presents results of a survey of Malawi's public, parastatal, and private EDT needs in view of a proposed A.I.D. project to meet these needs by expanding Malawi's Polytechnic Institute (PI).

The survey team's main findings and recommendations were as follows: (1) Until 1983 when the first PI engineers graduate, the demand for EDT's can only partially be met, and at considerable loss to Malawi, by significantly increasing the training of Malawians abroad, employing more expatriates, delaying low-priority projects, and attempting labor substitution. (2) Proposed PI targets should be increased in light of the extent of the growing demand for EDT's. (3) PI expansion will correct past qualitative deficiencies, e.g., by expanding the workshop program and adding agro-industrial and other needs-oriented courses. (4) To ensure a proper ratio of indigenous and expatriate EDT's, a localization plan, including a monitored training plan, should be developed. (5) Training abroad was generally found to be of high quality and suited to student career goals and to job requirements (mainly, building rural infrastructure). (6) Improved secondary schooling will result in less failures at the PI level, and the degree program will attract better students, currently employed EDT's, and women. (7) No serious problem exists with government EDT's leaving the country or changing fields. (8) The Project Paper team should include, according to a Government of Malawi recommendation, three experts (and not six as previously proposed), one



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each in engineering, education, and planning. The team should review all pertinent literature; study past expansion efforts and the present situation, especially the Malawi (British) education system; and distinguish project aspects which do not need further study from those which do. The latter include the localization problem, future engineering needs in Lilongwe, and an incentive program to ensure against high PI staff turnover. Appendices include a 19-item bibliography (1971-80).

088

PN-AAK-276

MF \$1.08/PC \$5.85

Indicators of education in A.I.D. assisted countries

U.S. Agency for International Development. Economic and Social Data Services Division

ESDS Statistical profile series, Jul 1981, 45p. : En

Education and human resource development have been and remain an A.I.D. priority. To assist in such efforts, A.I.D.'s Economic and Social Data Services Division (ESDS) has developed this reference of statistical indicators of education in AID-assisted countries, one in a series of ESDS statistical profiles prepared for sectors assigned high priority by A.I.D.

Indicators are presented in the following subject areas: (1) the magnitude and rate of adult literacy and illiteracy; (2) primary and secondary school enrollment, including changes in enrollment, pupil-teacher ratios, female participation, and net enrollment by grade and age group; (3) efficiency of education, that is educational resources wasted through repetition of grades and dropping out from the educational system; and (4) education expenditures, including expenditures as percentages of GNP and of total public expenditures, expenditures by educational level and per student, and rate of return by educational level.

The indicators are based on data from major international organizations such as the United Nations Educational Scientific and Cultural Organization, the World Bank, and the International Monetary Fund and from the U.S. Bureau of the Census. Data are presented for a total of 65 AID-assisted countries in Asia, Africa, and Latin America and in most cases reflect conditions in the late 1970's.

089

PN-AAK-374

MF \$1.08/PC \$2.34

The implementation of principles for effective participation of colleges and universities in international development activities

Magrath, C.P.

International Development Cooperation Agency. Board for International Food and Agricultural Development

BIFAD Occasional Paper, no.5, 1981, : En

(Reprint of a speech delivered to the National Association of State Universities and Land-Grant Colleges annual meeting; Atlanta, Georgia, 16-19 November, 1980)

The future success of U.S. universities in implementing international educational programs (IEP's) will be determined more by the policies set in Washington than by the organizational principles embraced by the universities themselves.

With this statement, the author begins a discussion, presented before a meeting of the National Association of State Universities and Land Grant Colleges, of principles and models

for the effective participation of U.S. universities in IEP's. The author notes that the principles for implementing IEP's are broad and depend upon the commitment of an institution's faculty and administration and on the availability of resources. It is the latter, in the author's view, which is in short supply. Consequently, he focuses on the challenge of convincing policymakers in Washington of the worth of IEP's, a challenge based on the belief that Washington sets the nation's foreign policy agenda, on the assumption that U.S. universities are an untapped development resource, and on the expectation of reduced Congressional funding of IEP's.

The author proceeds to pose two models. One describes a continuation of the present relationship between U.S. universities and the Title XII-A.I.D./Board for International Food and Agricultural Development (BIFAD) system but with added funding and less red tape. As an alternative, he calls for a federal commitment of \$1.5 billion (the cost of 2.5 MX missiles) to initiate an umbrella structure for funding IEP classroom activities (e.g., foreign language education); educational research (e.g., collaborative investigation of overpopulation); and service and extension activities (e.g., establishing foreign policy analysis centers).

Concluding with the argument that "nothing less is at stake than the nation's security," the author dismisses the position that a massive IEP program is too expensive in a time of fiscal austerity.

090

PN-AAK-799

MF \$1.08/PC \$3.25

Human resources sector analysis

Rifkin, Norman

U.S. Agency for International Development. Office of Sahel and Francophone West Africa

1980, 25p. : En

To help identify the human resources needed for the Sahel's development over the next 20 years, this report analyzes three areas of education—formal (primary and secondary), technical and higher, and nonformal (NFE)—and suggests priority areas for A.I.D. support.

The formal system, with its agriculturally irrelevant curriculum and inefficiency, encourages high attrition and rural to urban migration and no significant expansion seems imminent. The chief aim in the short term should be to raise the enrollment ratio by increasing the number of those completing the full primary cycle. Mid-and long-term needs are to expand the system (first at the secondary but ultimately at the primary level) and to evaluate it with respect to changing manpower needs.

A severe shortage of trained professionals at the higher and technical levels impedes development in the region. In the short term, A.I.D. should continue, except in Mauritania, the present level of direct support of agricultural and livestock training institutions, increase participant and in-service planning and management training, strengthen teacher training institutions to help expand the formal system, and provide advanced scientific and agricultural training to university professors. In the mid-term, A.I.D. should support management training institutions as its top priority, assist select undergraduate scientific and technical programs, and support national graduate programs that can serve key regional needs.

In strengthening the NFE system to make up for inadequacies in the formal system, there is a need in the short term to develop replicable, low-cost, and well-targeted NFE pilot projects; promote radio as a tool for development; and provide in-

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service training for administrative personnel. Strengthening the outreach capacities of mid-level institutions and extension services and refining information delivery systems are recommended for the mid-term, while long-term goals should focus

on allowing school leavers to learn useful skills informally and on permitting their re-entrance to the formal system.

Overall priorities for A.I.D. are to expand and reform primary schools (an area in which A.I.D. has made virtually no input in the region); strengthen the growth of Sahelian training institutions; and fill the donor gap in funding NFE activities.





ENVIRONMENT & NATURAL RESOURCES

091

PN-AAK-019

MF \$2.16/PC \$16.25

The Dominican Republic: country environmental profile; a field study

Hartshorn, Gary; Antonini, Gustavo; DuBois, Random; Harcharik, David; Heckadon, Stanley; Newton, Harvey; Quesada, Carlos; Shores, John; Staples, George

JRB Associates, Inc.

1981, 128p. : En

AID/SOD/PDC-C-0247

Environmental degradation in the Dominican Republic (DR) caused by energy and food limitations and rapid population growth portend a bleak future unless a qualitatively different relationship between the Dominican people and the country's natural resources can enable the DR to become self-sufficient in food, increase agricultural exports, generate local renewable energy sources, and implement a realistic population policy over the next decade. This environmental profile identifies trends in the use of the DR's natural resources (vegetation, plantation forestry, water, soils, coastal and marine resources, wildlands and wildlife) and reviews government policies and institutions related to conservation, pollution, and environmental management.

Slash and burn agriculturalists and charcoal makers are rapidly depleting broad-leaved forests in the lowlands, indicating that reforestation programs to slow erosion and provide fuelwood should be expanded and that the technical expertise of FORESTA (Direccion General Forestal) should be substantially upgraded and incentives offered for private reforestation efforts. A national emergency should be invoked to contain watershed erosion (100-500 t/ha per year) that is drowning major reservoirs with sediments. Soil erosion is the DR's most serious environmental problem as poor practices of hillside farming, slash and burn agriculture, poor drainage techniques, and continued exploitation of marginal lands reduce topsoil and in some areas cause salinization. Unclear legislation, lack of inter-agency cooperation, and the absence of data on the effects of exploitation of coastal and marine resources and wildlife and wildlands have hampered efforts to effectively protect these resources.

The support of small farmers in integrated land management and watershed rehabilitation programs, the establishment of government policy and guidelines for resource management, and the cooperation of institutions in pollution control and preservation are crucial for the future protection of the DR's natural resources.

A 163-item bibliography (1832-1981) is included.

092

PN-AAK-024

MF \$2.16/PC \$16.90

Draft environmental profile on the Republic of Costa Rica

Arizona University. Office of Arid Lands Studies

1981, 129p. : En

Sponsored by AID through the U.S. National Committee for Man and the Biosphere

SA/TOA-1-77

Despite its relatively small size, Costa Rica is endowed with a rich variety of physical and biological resources. Nonetheless, destruction of forests, degradation of the land, and the Costa Rican Government's lack of relevant information and expertise are pressing problems. This report presents a preliminary

review of information available on Costa Rica's natural resources and environment, including the nation's geography, climate, demography, land use patterns, mineral and water resources, soils, flora and fauna, and environmental pollutants.

Costa Rica's traditional focus on agriculture has resulted in extensive clearing of native forests for conversion to cropland and more recently for use as cattle pasture land. In clearing forests, timber has not been utilized but has been burned or left to rot. Colonization and land tenure laws which encourage clearing rather than conservation have exacerbated the problem. Reforestation has been scanty in part due to a lack of incentives. The related problem of progressive land degradation has ensued both near population centers and, with recent road construction, on the Caribbean slope. Several years of annual cropping have resulted in a loss of soil fertility followed by conversion to weedy and unproductive pasture. Intensively used areas also suffer from flooding, landslides, and general erosion.

Finally, although the Costa Rican Government's natural resource and pollution monitoring systems are severely deficient, great strides have been made toward achieving important conservation goals. Population growth has been significantly reduced, an extensive national park system has been established, land use reforms have been undertaken, and efforts to control pollution have been made.

Appended are surveys of water supplies and energy resources, reviews of environmental legislation and relevant USAID/CR programs, a list of government agencies with environmental responsibilities, and a 146-item Spanish and English bibliography (1910-80).

093

PN-AAK-250

MF \$1.08/PC \$8.84

Environment and bilateral development aid: the environmental policies, programs, and performance of the development assistance agencies of Canada, the Federal Republic of Germany, the Netherlands, Sweden, the United Kingdom, and the United States

Johnson, Brian; Blake, R.O.

International Institute for Environment and Development

1979, 67p. : En

The development assistance agencies of Canada, the Federal Republic of Germany, the Netherlands, Sweden, the United Kingdom, and the United States (i.e., A.I.D.) need to make significant improvements in meeting the environmental needs of developing countries. This report assesses the extent to which the policies, procedures, and programs of these six bilateral agencies promote sustainable and environmentally sound development. The constitutional, organizational, and cultural factors which influence each national agency's efforts to improve the quality of development aid are reviewed and effective leadership is identified as the key to environmental sensitivity.

Findings are presented and recommendations made for seven areas of development agency activities. (1) Although all of the agencies agree on the importance of environmental matters, none has integrated these concerns into its overall aid objectives. There is a need to thoroughly define environmental and natural resource objectives in the context of aid programs as a whole. (2) Agencies have normally acted in response to a developing country's request for help. Urgent attention should be given to helping developing countries build up their own



capacity to study and manage environmental problems. (3) Resources available for environmental enhancement projects are still minute when compared to traditional projects such as road construction and power generation. There is a need to encourage and provide a much higher level of funding for conservation and rehabilitation projects. (4) Policy documents intended to govern project design and execution frequently lack adequate attention to environmental implications. Policy instruction is necessary to ensure that the project design process incorporates environmental considerations. (5) In only three of the agencies studied was there a clearly defined focal point for environmental responsibility. A framework for systematically monitoring environmental implications is essential. (6) In only one of the agencies studied are projects screened for environmental impact. Procedures to ensure systematic screening are needed. (7) To date, there has been little contact among agencies on questions of environmental protection and improvement. Greater multilateral cooperation in the utilization of donor country resources would be beneficial.

094

PN-AAK-251

MF \$4.32/PC \$45.24

Profile of the endangered species of Thailand

Bain, J.R.; Humphrey, S.R.

Florida University. Office of Ecological Services. Florida State Museum

1982, 2v. : v.1 Through birds; v.2 Mammals, En

Thousands of species of plants and animals worldwide are endangered or threatened by deforestation, hunting, and other human activities. This two-volume study profiles 155 threatened or endangered species in Thailand and describes their biological and management needs. These 155 species were selected on the basis of literature searches, site visits, and correspondence with the International Union for the Conservation of Nature and Natural Resources.

Volume 1 profiles 91 plants, invertebrates, fish, amphibians, reptiles, and birds, while Volume 2 profiles 64 mammals. For each species, data are presented on: status, population size and trend, past and present distribution, geographic status (e.g., vagrant, migratory), habitat requirements and trends, and vulnerability of species and habitat. Also identified are causes of the threat, species' response to habitat modification, demographic characteristics, key behaviors, and conservation measures taken or proposed. Maps showing species' distributions are provided. Volume 1 also describes the following essential habitats, ranked according to number of endangered species present and the imminence of habitat conversion: wetlands, Mekong River basin, tropical lowland evergreen forest, hill evergreen forest, dry evergreen forest, dry dipterocarp, mixed deciduous-evergreen forest, mangrove forest, and southeastern coastal rivers. Maps of terrestrial vegetation and deforested areas are provided in Volume 1 and a 692-item reference list (1666-1981) is included in Volume 2.

The authors note, however, that the data presented in these volumes represent only the tip of the iceberg. Literally thousands of plant and animal species are threatened by continued deforestation, but not enough information exists to assess the status of these species, some of which may not yet be known to science. Habitat changes have resulted in the extirpation from Thailand of the large grass warbler, Shomburgk's deer, and the eastern sarus crane, as well as in the probable extirpation of black and giant ibises, salt and freshwater crocodiles, the Asian bonytongue, burnt-tail carp, false gavials,

the Javan rhino, Eld's Brow-antlered deer, Indochinese hog deer, the Chinese crested tern, and the koupry.

095

PN-AAK-359

MF \$1.08/PC \$11.31

An environmental profile of Guatemala; phase II: assessment of environmental problems and short-and long-term strategies for problem solution

Cooley, J.L.; Farnworth, E.G.; Hoy, D. R.; Jordan, C. F.

University of Georgia. Institute of Ecology

1981, 87p. : En

Sponsored by AID through the U.S. National Committee for Man and the Biosphere

SA/TOA-1-77

Building on data from previous studies, this report presents short-and long-term strategies to alleviate Guatemala's environmental problems.

Initial sections detail the country's major environmental problems (deforestation in watersheds and the coastal zone, water quality and quantity, dangers to wildlife and fisheries, health and environmental effects of pesticide use, and urban/industrial pollution); highlight an economically-dominated view of development as a main cause of environmental degradation; discuss existing environmental policies, institutions, and programs; and explore constraints to solving environmental problems, especially reforestation and water pollution reduction efforts.

The following demonstration projects are recommended as feasible for the short-term (within 10 years): an integrated watershed-village management project; a comparison between till and no-till agriculture to combat soil erosion; an agricultural/ecological experiment station in the Peten region to find innovative ways to manage agricultural systems; at least one forest ecology experiment station, preferably in the altiplano region; a collaborative project between planners and ecologists to develop the Transversal region while protecting economically important species; expansion of the Guatemalan "biotope" in the Atlantic montane rain forest reserve to assure preservation of the Quetzal and determine other unique ecosystems that qualify as reserves; economic analysis of the market and non-market benefits and costs of sewage treatment; a project to divert sewage into settling ponds (rather than dumping it into streams) and to utilize treated sewage and water for farm land enhancement; economic analysis of the non-market costs of deteriorating air quality in Guatemala City; and training a cadre of workers to work with villagers and national agencies to implement the above projects.

For the long-term, it is recommended that a national agency be created to integrate environmental concerns and set and enforce environmental standards (a 1976 bill to create such an agency is still pending in the Guatemalan legislature), and that pressure on forests and soils be reduced by developing alternative economic strategies, e.g., occupations requiring little energy or space. Included are 67 references (1951-80).



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096

PN-AAK-590

MF \$2.16/PC \$15.86

Draft environmental profile of Nicaragua

Hilty, S.L.

Arizona University. Office of Arid Lands Studies

1981, 122p. : En

Sponsored by AID through the U.S. National Committee for Man and the Biosphere

SA/TOA 1-77

Nicaragua's environmental problems, stemming from an absence of environmental and land use planning, have been aggravated by the destructive effects of the 1972 earthquake and the 1978 civil War. This report provides an overview of Nicaragua's geography, population, and land use; details the country's environmental resources; and discusses key environmental problems.

The first section describes Nicaragua's topography (divided into the Pacific coast, the central highlands, and the Caribbean lowlands); lakes and drainage; seismicity; and climate (divided into the wet and tropical east, the tropical wet and dry west, and the mild highlands). Next discussed are the culture and politics of the Nicaraguan people, population growth and distribution, and health and nutrition. Land use is discussed in terms of trends, farm size, crops, livestock, and pastures.

Environmental resources are profiled regarding geology, minerals, and soils; water resources, both urban and rural; energy resources; vegetation, emphasizing forests; and wildlife (mammals, birds, fish) and related conservation measures.

Nicaragua's main environmental problems are identified as: (1) unbalanced resource use (i.e., exploitation of the Pacific slope while the fragile ecosystem of the Caribbean slope remains largely unpopulated and unexploited); (2) inappropriate land use (i.e., cultivation of annual crops on steep slopes causes erosion, while more fertile land is often used for cattle pasture); (3) deforestation, hastened by uncontrolled colonization and growing demand for firewood, and the absence of reforestation; and (4) environmentally related health problems (e.g., the widespread incidence of malaria and contamination of the environment by pesticides).

Appended are a list of native trees, a review of the Nicaraguan Government's environmental policies, a summary of environmentally significant A.I.D. projects in Nicaragua, a list of acronyms, and a 92-item Spanish and English bibliography (1909-80).

097

PN-AAK-676

MF \$0/PC \$65.78

Proceedings

(Watershed Resources Management and Environmental Monitoring in Humid and Tropical Ecosystems, Chiang Mai, TH, 25 May-8 Jun 1981)

1981, 510p. : En

Exploitation of Southeast Asia's watershed resources has resulted in extreme environmental degradation—soil erosion, sedimentation of waterways, loss of watershed productivity, and depletion of soil nutrients. To address the recently recognized need for careful watershed resource management, a regional training course, the proceedings of which are herein presented, was held in Chiang Mai, Thailand.

The course sought to: transfer to the 26 participants and 30 observers knowledge on various facets of watershed resources management; provide training in watershed resources re-

search, planning, management, and regulation; emphasize multi-purpose use of and cost-effective protection of watershed areas; report on the status of watershed management in Southeast Asia; and provide first-hand observation of watershed protection techniques in Thailand.

Lectures were given on: watershed resources management in humid tropical ecosystems; the legal and ecological aspects of watershed resources management; environmental considerations in watershed management, including a case study on the Lam Nam Oon Watershed; a case study on environmental restoration in Huai Thung Choa; and highland agriculture and community development. Country reports were presented for Sri Lanka, China, Nepal, Malaysia, Indonesia, and Thailand.

It was concluded that in Southeast Asia: (1) watersheds are and will continue to be the most valuable resource; (2) common watershed resources management problems exist (e.g., overgrazing and insufficient reforestation); and (3) although practical watershed management techniques have been demonstrated, their use is impeded by local customs, difficulty in enforcing the law, and the low income of watershed users.

Appendices include a report on water sampling and laboratory analysis; a review of problems encountered during the course; a summary evaluation of the course; the course final examination; preliminary inventory of watershed management projects in Thailand; and a list of course lecturers, participants, observers, and organizing staff.

098

PN-AAK-877

MF \$5.40/PC \$60.58

Situation and trends of renewable natural resources of Latin America and the Caribbean

Dourojeanni, Marc J.

World Wildlife Fund-U.S.

1980, 423p. : En

Properly managed, the natural resources of Latin America and the Caribbean could meet the needs of the region's people. As part of an effort to identify the training needs of resource managers in the region, this report provides a geographic and demographic profile of the area and reviews the current and projected availability and use of the region's natural resources. Related energy and health problems are also considered, as are some of the causes of prevailing resource mismanagement.

By 2000, the region's population will probably grow from 350 million (1977) to over 600 million, with an average density of 30 persons per square km. Land use is currently distributed as follows: 9% arable land, 26% natural pastures, 49% forests, and 16% unused or occupied by infrastructure. Soils are poor, and urban expansion, pollution, loss of fertility, natural disasters, erosion, and salinization are contributing to land loss or deterioration. The expansion of stockraising and farming is destroying forests; by 2000, only 20-33% of the land area is expected to remain forested. Water is abundant but unequally distributed; only 3% of water resources and 8% of hydroelectric potential are being used. Pollution of fresh and sea water is a serious problem which is expected to worsen, as is air pollution in industrial urban areas. Native flora have been underutilized despite their potential as a source of medicine, drugs, rubber, resins, ornamentation, and recreation. Native fauna remain an important source of protein for rural dwellers. Extinction of plant and animal species is a critical problem. Although protected areas now cover 1.63% of the land area and are expected to double in size by 2000, they provide only

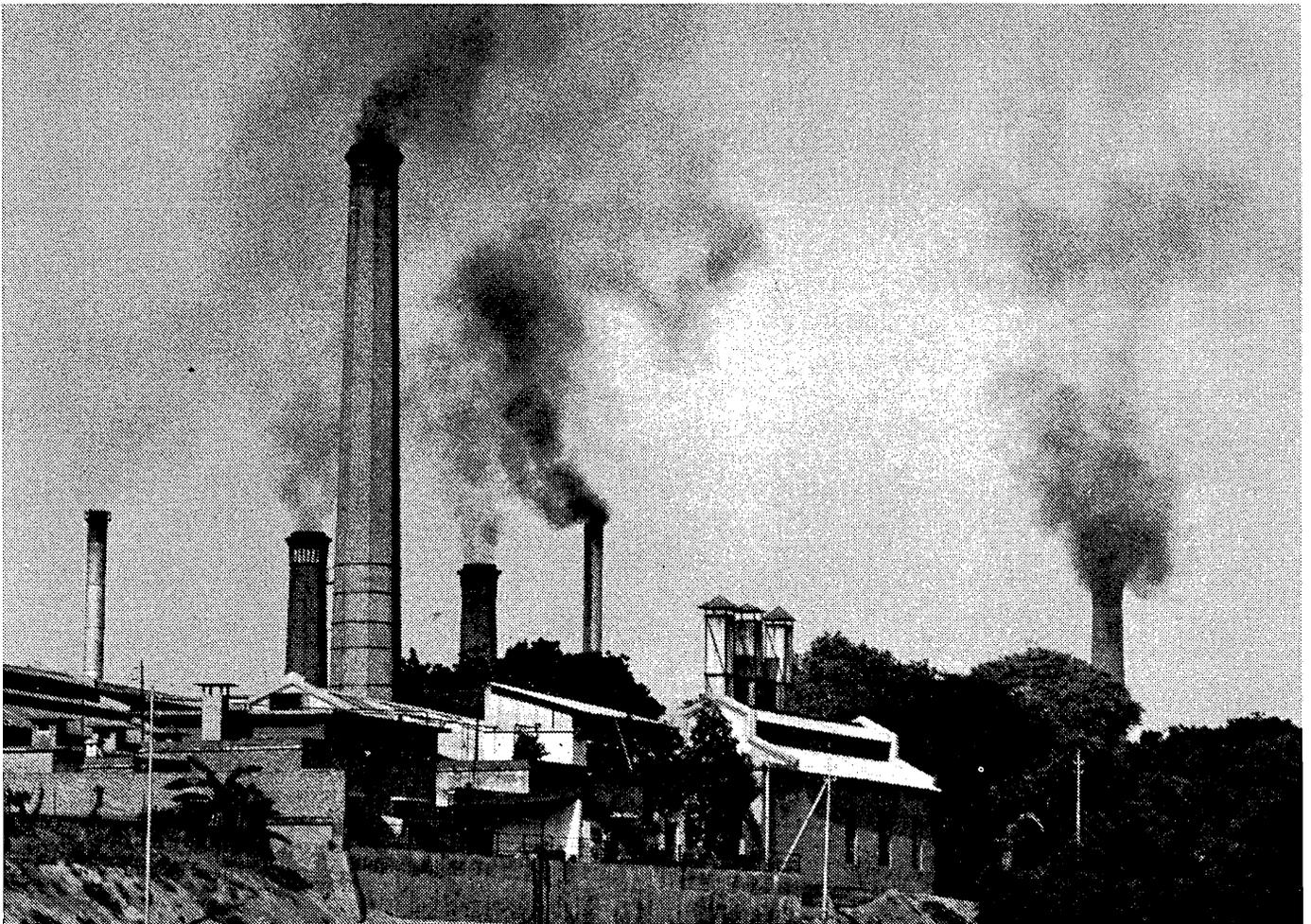


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minimal protection for endangered species. Mineral resources are abundant, but extraction efforts are likely to cause environmental harm. Growing energy demands will increasingly be met by hydroelectric and nuclear power, and non-conventional sources (i.e., geothermal and biomass) will gradually replace

petroleum. All these environmental problems, it is emphasized, are rooted in the poverty caused by social injustice and the region's domination by other continents.

Appended is a 231-item bibliography (1941-80) in Spanish and English.





099

PN-AAG-636

MF \$1.08/PC \$11.31

Health care financing in developing countries

Zschock, Dieter K.

APHA International Health Programs Monograph, no.1, 1979, 82p. : En

9310971

AID/ta-C-1320

To help developing countries and donors cope with dwindling financial resources in striving towards the World Health Organization's goal of health care for all by 2000, this study analyzes health care financing in the developing world.

Defining health care as "activities specifically intended to reduce morbidity and mortality", the study first analyzes the determinants of demand for health care (e.g., health status, income, education, cost, and accessibility). Next, the sources and merits of funding from public sources (tax revenues, deficit financing, lotteries) and private sources (insurance, charity, communal self-help) are considered and various analytical models of and evaluation criteria for health care financing methods are presented. Lastly, various systemic and five case studies of health care financing are reviewed.

Many common problems were found throughout the health care systems of developing nations that exacerbate the lack of funding. For example, funding sources are not well-coordinated. Public and private facilities are duplicative and community self-help efforts do not apply common standards of primary health care. Inefficient utilization of funds is evidenced by medical facilities designed without provision for operational support. Inequities in the distribution of funds are rife due to mismanagement and favoritism. Physicians frequently oppose reform and extension of the health care system for fear that paramedics and other non-physicians will usurp their administration of health services. To correct these deficiencies, developing nations should increase health care funding in coordination with other basic human needs programs (foreign aid agencies are generally supportive of coordinated trans-sectoral development programs); broaden the coverage of social insurance or nonprofit group health insurance; rely more on a concerted, standardized system of community self-help programs; end the revenue battles between public health and social insurance groups; routinely gather data as an essential part of informed health policy formulation; and undertake paramedic health care extension programs with international donors where indigenous health professionals are unwilling to do so.

An 82-item bibliography (1962-77) is appended.

100

PN-AAJ-106

MF \$1.08/PC \$6.50

Guidelines for analysis of indigenous and private health care planning in developing countries

Scrimshaw, Susan

Stanford Research Institute

E.H. White Company

International Health Planning Methods Series, v.6, 1979, 47p.

: En

931006700

RE/HEW/OIH-01-74

To integrate health planning into overall economic planning, developing nations must assess the health care provided

outside the public sector by indigenous (traditional) and by private, Western-trained practitioners. This manual provides a framework for such an assessment.

Chapter one summarizes the major reasons for including non-public health care providers in the total health sector assessment, e.g., a highly developed health infrastructure is frequently lacking and the deeply ingrained cultural health beliefs of the people minimize the applicability of Western medicine.

After detailing the nature and importance of such belief systems, a typology of indigenous and Western-oriented health practitioners is presented in terms of their curing roles (including specialization, selection and training, certification, professional image, expectation of payment, and "use" of supranatural powers) and their method of interacting with their patients. A brief discussion of health decisionmaking patterns indicates that the use of multiple health practitioners, when available, is common.

In the third chapter, the use of multiple practitioners is advocated as a way of integrating indigenous and Western-oriented health systems. Various approaches to integration—adaptation, accommodation, competition, replacement, and addition—are discussed.

Chapter four provides a methodology for a total health sector assessment. The first step is to explore existing knowledge and resources and includes gaining impressions from the community by consulting experts, reviewing social statistics, and taking community surveys. In the last-named, suggestions are given on the development of questionnaires and sampling methods and on selection and training of interviewers. For actual data collection and analysis, an outline of data to be gathered is provided along with recommendations for analysis and summarization. The author concludes that indigenous and private practitioners must be incorporated into developing country health care systems if the United Nations goal of minimal health service for all by the year 2000 is to be met.

A 40-item reference list (1955-78) is appended.

101

PN-AAJ-887

MF \$1.08/PC \$11.70

Environmental sanitation and integrated health delivery

Pineo, C.S.; Schnare, D.W.; Miller, G.W.

American Public Health Association

APHA International Health Programs Monograph, no.4, 1981, 91p. : En

931097100; 936590000

AID/ta-C-1320

The incidence of many major diseases which plague developing countries could be minimized through proper environmental sanitation (ES) practices such as excreta disposal, water purification, personal hygiene, and immunization. This study outlines a strategy for incorporating ES into integrated health delivery programs.

The first step is to identify and prioritize ES needs with the help of demographic, health, and socioeconomic data. To meet these needs, a solid understanding of organizational management and a willingness to deal with details are required. Project design components involve the specification of operational and maintenance activities, organizational structure at varying geographical levels, and requisite training and expertise. A feasible budget and an operational plan delineating responsibilities and authority should be prepared. Requirements for implementing



ES programs include sufficient operation and maintenance funds, trained manpower, use of technologies appropriate to site-specific constraints, and the creation or adaptation of local infrastructure. Criteria for evaluating completed ES programs include program objectives, side and multiplier effects, time frame, costs, community acceptance, institutionalization of change, and impact of extraneous factors. No matter how efficient program development is, however, experience shows that ES programs will fail if community participation is not engendered. There are several advantages to involving localities in the design and implementation of ES programs: (1) the utilization of villagers in program operation and maintenance lowers costs and increases community acceptance and appreciation; (2) successful program operation restores confidence in government actions; and (3) ES programs tend to last longer when communities have invested personal time and resources. Ignoring community desires and needs often results in: (1) project equipment that requires too much operation and maintenance; (2) technologies that are too expensive for local resources to maintain; and (3) labor-saving, capital-intensive machinery in countries with massive unemployment.

Appended are a 52-item bibliography (1962-79) and a list of international ES organizations.

102

PN-AAJ-899

MF \$2.16/PC \$23.79

Tanzania health sector strategy

Henn, A.E.

U.S. Agency for International Development. USAID/Tanzania 1980, 155p. : En

By sacrificing the possibility of more rapid economic growth, the Government of Tanzania (GOT) is developing a health care system to meet the immediate health needs of its people. To assist in the effort, this report reviews Tanzania's health sector and serves as a background against which USAID/T health, nutrition, and population projects can be designed and evaluated. Reviewed are the population's general health status; health sector organization and GOT sector policies and programs; sector contributions from donors, PVO's, the private sector, and traditional medicine; main sector constraints; and the GOT's future sector plans.

The GOT's main health sector goals are to reduce morbidity and mortality rates caused by malnutrition and communicable diseases (e.g., malaria) and to achieve self-sufficiency in providing health care to all Tanzanians. To this end, the GOT is decentralizing the health system with emphasis on rural facilities, personnel, and planning; developing preventive rather than curative services; and ensuring that donor support is consistent with self-determination in health care. To date, the GOT has successfully used paramedical personnel to extend health services, improved indices of health status, and assumed responsibility for AID-supported projects. Major health sector constraints include rapidly rising prices, a critical shortage of qualified personnel, poor communication and transport, and a paucity of information needed for planning and evaluation. To overcome these constraints and expand its health services, the GOT will continue to rely upon foreign financing and support, especially from A.I.D.

The author recommends that USAID/T support GOT health sector priorities and requests since they are consonant with the health needs of the people and with broad development goals. Specifically, USAID/T should: (1) support community efforts to understand local health problems; (2) support community-initiated health interventions; (3) train and support community-

level health workers; (4) assist in efforts to respond to Tanzania's high population growth rate; and (5) promote administrative and managerial capabilities of the health service delivery system at all levels.

Detailed descriptions of the health sector in Tanzania and Zanzibar are appended.

103

PN-AAJ-903

MF \$2.16/PC \$21.71

Social and economic preconditions for water supply and sanitation programs

Warner, D.B.

Camp Dresser & McKee, Inc.

1981, 167p. : En

931117600

AID/DSPE-C-0080

Community water supply and sanitation (CWSS) projects in developing countries often lead to only transitory adoption of sanitary and healthy behavior due to a failure to incorporate beneficiaries' socioeconomic needs and capabilities into project design. This study is designed to assist A.I.D. personnel and development planners in understanding the importance of social and economic preconditions in CWSS projects and to identify such preconditions in the field.

A literature review identifies relevant preconditions to integrate into project design, including a community's education and income level; social customs regarding water quality, hygiene, and sanitation; existing CWSS infrastructure and institutional capacity; and the level of technical CWSS sophistication acceptable to the target population.

A five step model is provided for identifying and assessing relevant preconditions for CWSS project formulation: (1) identify the area's CWSS needs and the development objectives of the community, domestic government, and USAID (e.g., a goal to promote self-help efforts and appropriate technology transfers); (2) determine the community's socioeconomic status and existing water and sanitation facilities by using composite indices (e.g., the Physical Quality of Life Index) to compare national development data; (3) select appropriate levels of water and sanitation technology (e.g., define a socially feasible technology hierarchy); (4) determine required support conditions attendant to technology (e.g., training, infrastructure, and maintenance); and (5) predict short- and long-term project impacts (e.g., behavioral and institutional changes). For practical use in areas which have never experienced formal program designs, this general theoretical framework must be field-tested to fit site-specific CWSS situations. In designing specific CWSS projects, the authors recommend that from the general preconditions presented here, CWSS planners choose to address those most related to national objectives and those for which institutional support will most likely be available. Intervention sites can then be selected and the nature and scope of the intervention can be determined according to perceived community needs and available resources.

A 67-item bibliography (1953-81) is appended.



A simplified health care program in rural Guatemala: the Patulul Project

Dalagado, H.L.; Belizan, J.M.; Valverde, V.E.; Giron, E.M.; Mejia, P., Victor; Klein, R.E.

Instituto de Nutricion de Centro America y Panama
PAHO Scientific Publication, no.12, 1980, 161p. : En.
931061100
AID/ta-C-1224

In 1976-77, the Institute of Nutrition of Central America and Panama (INCAP) adapted a previously developed simplified health care program for implementation in communities surrounding the town of Patulul, Guatemala. This report describes the Patulul experience—with special reference to program implementation, personnel training, quality control, and the development of preventive and curative care—and serves as a guide for groups interested in developing similar programs.

The project is characterized by a short implementation period, low costs, use of simple techniques, and community involvement. A special feature of the program is the training of auxiliary personnel (i.e., auxiliary nurses, health promoters, and midwives) as primary providers of health care. Prior to program implementation, available resources and the demand for health services were assessed and baseline demographic data were collected on each family.

The Patulul project contains the following four subprograms: (1) curative care provided at outpatient clinics, including clinical history, diagnosis, and treatment of common illnesses, with quality control ensured via direct physician observation of care provided by auxiliary personnel and referral of serious illnesses to physicians; (2) preventive care, consisting of vaccination and epidemic control programs to limit the incidence and spread of respiratory and gastrointestinal infections and including environmental sanitation activities; (3) maternal care, emphasizing early pregnancy detection, prenatal exams, assessment of delivery risk, vaccination of the mother against tetanus, child-birth attendance, and postpartum care, and promoting sex education to encourage responsible parenting, prevent abortions, and facilitate adequate child spacing; and (4) child care, including a nutritional recuperation program using milk or Incaparina supplements for children with protein-calorie malnutrition. The program was well accepted, notably reduced infant mortality, and encouraged private industry to help with health problems.

Appended are a 66-item bibliography (1940-78) and five annexes.

An evaluation of the methodology for analyzing the patterns and determinants of breast feeding and mortality in the Near East

Knodel, John
American Public Health Association
1981, 21p. : En
936590000
AID/DSPE-C-0053

Two prototype analyses of data on breastfeeding and infant mortality in Jordan form the basis of an A.I.D./University of North Carolina project to analyze the patterns and determi-

nants of breastfeeding and IF in the Near East. This report evaluates data analysis methodologies used in the pilot project.

Omissions in breastfeeding data make analysis of breastfeeding trends in Jordan impossible. To provide overall information on breastfeeding practices, however, the use of the current status method of estimating mean duration of breastfeeding in categories comparable to those used in the infant mortality analysis is strongly recommended, as are checks on the multivariate analysis used to control sample selection bias and repetition of the analysis in categories comparable to the infant mortality analysis for the individual variables. Data on pill use, maternal labor force participation, and education should be interpreted with caution. Misreporting duration of breastfeeding has been alleviated by separately analyzing dichotomous dependent variables employing an X function. A standard statistical estimation procedure has been employed to define dichotomous variables, but the analysis needs to be amplified and its results presented in more comprehensible language.

The prototype analysis of infant mortality is on the right track, but could be improved in several ways: (1) by finding ways to avoid age misstatement in neonatal and postnatal deaths; (2) by comparing mortality rates obtained in this study with those available from other sources; (3) by extending the analysis to include child and infant mortality; (4) by modifying the multivariate analysis to assess the total effect of the variables; and (5) by converting multivariate analysis results to a more comprehensible format.

To improve the project overall, the authors recommend: (1) increasing coordination between the two components by using either weighted or unweighted samples for the multivariate analysis, using comparable socioeconomic and demographic variables, and sharing common data problems; (2) noting cross-country differences in defining variables; (3) introducing a variable representing a region of a country in both project components; (4) making results more comprehensible to non-experts; and (5) submitting a combined final report for comparison purposes and as a policy aid. Appended is a list of contacts.

Burundi health sector assessment and strategy

Kennedy, John; Delliquadri, Lawrence; et al
Dimpex Associates, Inc.
1981, 288p. : En
French edition: PN-AAJ-992
AID/afr-C-1701

On the basis of a wide range of documents, personnel interviews, and selected field visits, the authors of this study assess Burundi's health sector and suggest strategies for A.I.D. assistance.

Geographic, demographic, educational, economic, and cultural data form the background for an analysis of the people's health status in terms of morbidity and mortality, general disease patterns, principal diseases (malaria, influenza, measles, diarrheas, whooping cough, pneumonia, and intestinal parasites), and the economic and development costs of poor health and high population growth rates (2.0-2.7%). A major restructuring of health programs away from urban curative services towards rural primary health care has been proposed under the Government of Burundi's (GOB) current health development strategy. To this end, the building or upgrading of



336 rural health centers has been planned. At current fertility levels, however, 504 centers will be needed by 1991. An overview of the organization of the Ministry of Health reveals a need for greater decentralization and for improved logistical support, medications supply, and equipment maintenance to effect the planned new emphasis on preventive health. Other health sector constraints include poor distribution of manpower and a lack of official support for family planning.

The study also describes the importance of religious missions (e.g., CARITAS), international organizations (e.g., UNICEF), and bilateral assistance projects (e.g., Belgian grants) to Burundi's health services infrastructure. These organizations provide major health programs in communicable disease control, basic health services, family planning, nutrition/food production, health education, rural water supply development, and environmental sanitation. The authors conclude that foreign assistance can be most useful in "sensitizing" the GOB and health practitioners to accept the need for family planning efforts and to further the extension of primary care into rural areas by helping to reorganize the Ministry of Health and to revise training systems for health personnel.

A 37-item bibliography (1957-81) and 30 annexes are appended.

107

PN-AAJ-993

MF \$2.16/PC \$14.43

AUPHA management problem-solving (MAPS) module: materials and facilities management

de Geyndt, Willy; Filerman, G.L.

Association of University Programs in Health Administration

1981, 112p. : En

931101600

AID/ta-C-1480

Next to staff salaries, the cost of materials and facilities is the largest expense incurred by developing country health systems, especially in countries which depend upon imported goods. This report, one of the Association of University Programs in Health Administration's management problem-solving (MAPS) modules, is intended to assist developing country health managers to reduce health system costs by obtaining high quality supplies as cheaply as possible and by controlling the use of supplies once obtained.

An introductory section defines the materials and facilities management system in terms of its subfunctions and points to the need for managers to identify which subfunctions do not work well or do not work well together. A module is then presented for assessing the management of the materials and facilities system in terms of the following eight subfunctions—planning and budgeting, purchasing, receiving and inspecting, storage and warehousing, inventory control, requisitioning and distributing, maintenance and repair, and environmental management. Each section defines the subfunction and lists appropriate questions to identify organizational inadequacies. The report summarizes the assessment process by recommending that managers derive a list of problems preventing effective performance, using the adequacy scales in each section; decide which is the priority problem for each subfunction; list all possible solutions for each priority problem; and, on a scale of 1-5, determine the expected level of impact and the feasibility of each solution.

Suggestions for analyzing the problems identified through use of the module and a user's guide to the MAPS series are included. Five references (1978-81) are appended.

108

PN-AAJ-994

MF \$1.08/PC \$7.54

AUPHA management problem-solving (MAPS) module: community and external relations

Brown, G.D.; Feirman, Harry

Association of University Programs in Health Administration

1981, 58p. : En

931101600

AID/ta-C-1480

To help health managers make their organizations more effective, this report, one of the Association of University Programs in Health Administration's management problem-solving (MAPS) modules, presents practical exercises for assessing an organization's performance in terms of the health services it delivers, the community it serves, and the impediments it faces in the task of self-improvement. Specifically, the module is intended to help managers identify organizational objectives and the constraints which impede their realization and to develop strategies to relieve these constraints.

The assessment takes place in five successive steps. (1) The first step involves examining the current level of performance, including developing a working definition of community; collecting statistics on community residents (i.e., age, geographic distribution, employment, and health status) and their living environment (i.e., housing, sanitation, and water); and ensuring that all health personnel have a common understanding of the range of services provided in the community. (2) The next step is to analyze various characteristics of health service delivery, such as availability, accessibility, continuity, quality, equity, and acceptability. (3) This done, it is necessary to identify and prioritize the problem areas most in need of improvement and to develop appropriate solutions such as adding possible inputs or reallocating current resources. (4) Then follows the task of identifying the factors which prevent the fulfillment of chosen objectives or make organizational performance ineffective, and determining whether to risk organizational changes to alleviate these constraints. (5) The final step in the process is to develop strategies to alter organizational behavior so as to relieve identified constraints. These strategies vary, depending on the degree of the organization's control over the factors involved and the extent to which individuals, groups, and organizations agree on the proposed change. Strategy suggestions are made for cases in which agreement exists or can be effected through persuasion, or in which there are basic differences of viewpoint.

Included are numerous tables and checklists for carrying out the exercises.

109

PN-AAJ-995

MF \$1.08/PC \$10.66

AUPHA management problem-solving (MAPS) module: financial management

Quintana, Olga

Association of University Programs in Health Administration

1981, 82p. : En

931101600

AID/ta-C-1480

Rapid increases in health care costs and dwindling financial resources make it imperative that health program managers carefully assess their budgetary practices. Against a background discussion of the development of the Association of University Programs in Health Administration's management



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problem solving (MAPS) modules for health managers, this report presents a module on financial management to assist health managers in evaluating and improving budgetary systems.

The report focuses on three levels of health care: the ministry of health, district health offices, and hospitals. An effective budgeting program must contain four essential characteristics: (1) a sound organizational structure with clearly defined lines of authority; (2) a detailed accounts listing; (3) appropriate statistics on the volume of services; and (4) management support and formal budgeting procedures. The module provides a package for assessing budgeting practices, accounting systems, and auditing programs.

Specific budgetary questions aimed at ministry level decisionmakers address involvement of key personnel; costs classification; development of annual budget, expense, and revenue projections; funds control; and type of approach (incremental, program, planning program budget systems, and zero base). Accounting questions examine cost finding methods, financial constraints, cash and accrual accounting, and records; auditing questions address types of audits, filing procedures, and keeping records of payroll and disbursements.

At the district level, budgetary considerations include budget creation, documentation, the approval process, data acquisition, and reports preparation; accounting questions are limited to payroll and inventory and use of statistical information. Auditing questions parallel those found in the ministry section.

The module directs hospitals to study preparation, approval, appropriations, and allocations and presents questions similar to those at the district level. Accounting questions unique to hospitals address hospital fund accounting, sources of revenue, aging accounts receivable, patient deposits, and service rates. Auditing questions, once again, are in the ministry section.

Two reference lists (7 items, 1974-81 and 13 items, 1968-80) are appended.

110

PN-AAJ-996

MF \$1.08/PC \$8.19

AUPHA management problem-solving (MAPS) module: organizational design

Kaluzny, Arnold D.

Association of University Programs in Health Administration

1981, 63p. : En

931101600

AID/ta-C-1480

It is increasingly evident that organizational design—the arrangement of an organization's activities and roles—is a critical factor in organizational performance. This report, part of the Association of University Programs in Health Administration's health management problem-solving (MAPS) modules series, describes a method for assessing organizational design in light of a health organization's goals.

The author begins by making several practical recommendations for health managers using the module: keep to small, lower-level changes in attempting to reform well-established organizations; conduct the assessment without threatening people in the organization; consider carefully any changes to be made and implement them gradually; and involve as many organizational levels as possible in the assessment. The first step in the assessment consists of profiling the design characteristics of either individual work units or the total organization. For work groups, questions are provided for rating, on a scale

of 1 to 5, six variables (others may be added as appropriate) relating to task complexity and predictability: (1) degree of formalization (adherence to rules and procedures); (2) degree of centralization (need to depend on supervisors); (3) complexity (the number of tasks to be performed); (4) goal setting (the purpose of the tasks and performance measures); (5) vertical coordination (interaction between superiors and inferiors); and (6) horizontal coordination (interaction with those on the same organizational level). A similar format for assessing the complexity and uncertainty of the environment surrounding the total organization is provided. To improve organizational performance, a series of tables are provided outlining work group and total organizational strategies to remedy specific weaknesses in the six above-noted variables, e.g., developing self-contained tasks when working in uncertain environments and developing measures to improve unsatisfactory horizontal relations among work groups. Finally, exercises are provided to help managers implement each strategy.

Included are a user's guide to the MAPS series and a 10-item reference list (1971-80).

111

PN-AAJ-997

MF \$1.08/PC \$7.54

AUPHA management problem-solving (MAPS) module: patient services management

Clark, Noreen; Clarke, R.N.; Wilson-Scott, D.

Association of University Programs in Health Administration

1981, 58p. : En

931101600

AID/ta-C-1480

Assessing the quality of patient care involves not only collecting objective data on patients as recipients of health services, but also on personal expectations, patient satisfaction with services rendered, and the effect of health services on patients' physical and emotional well-being. This report, one of the Association of University Programs in Health Administration's management-problem solving (MAPS) modules, describes a method to enable health service managers in developing countries to assess the quality of patient care.

Question areas within the module (which are addressed to managers but adaptable to patients) are based on the conviction that resolution of health problems requires assessment not only of patient/client aspects of curative health care, but also of environmental concerns and primary health systems. (This latter belief is due to the fact that many of the changes in the health status of developing countries have resulted not from provision of medical care but from efforts to control environmental adversities, provide basic preventive services, and facilitate patient access to resources needed for healthful behavior). Accordingly, a series of questions are presented which enable health managers to gather patient feedback in the following areas: (1) access and availability of health services, including relevance of services to country health conditions, the determination of monetary and emotional costs of services, and forms of payment; (2) quality of service in terms of the attitudes of health service providers, follow-up and monitoring procedures, recording service utilization rates, and appropriateness of service to the patient's condition; (3) educative activities, including the community's awareness and support of services, community education and outreach programs, and community feedback; and (4) competition and cooperation among various health providers, including traditional and indigenous health workers.



Included are practical tips on collecting data, especially in sensitive areas; a simple method to differentiate key problems and develop appropriate solutions; suggestions for problem analysis; a user's guide to the MAPS series; and a 7-item reference list (1974-81).

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PN-AAJ-998

MF \$2.16/PC \$14.30

AUPHA management problem-solving (MAPS) module: personnel and human resources management

Harrison, Steven; Cox, Peter; Barker, Carol; Greenwood, Ned
Association of University Programs in Health Administration
1981, 110p. : En
931101600
AID/ta-C-1480

Due to the labor-intensive nature of health care and its reliance on people to produce quality output, the monitoring of human resources is a crucial aspect of health management. This report, one of the Association of University Programs in Health Administration's management problem-solving (MAPS) modules, is intended to assist health managers and other concerned personnel in monitoring the use of human resources to avoid the dangers of gradual declines in performance and the adoption of ad hoc measures that fail to address deep-seated problems.

An initial section identifies five types of problems a health manager may face, namely, how to: efficiently achieve a desired improvement; define and implement a future objective; identify, understand, and eradicate causes of deterioration; make plans to prevent future deterioration; and evaluate the costs and benefits of alternative solutions. Managers are cautioned against judging the importance of a problem by the relative position of the problem's originator, or by the method (verbal or written) in which the problem is brought to the manager's attention, rather than by the actual nature of the



The barefoot doctor concept, personified here by a Haitian "promotora" administering a smallpox vaccination in her village, helps optimize scarce health sector resources.



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problem itself. A method is then presented for gathering data on and prioritizing problems in regard to personnel management, manpower supply, and employee remuneration, job satisfaction and "productivity". It is stressed that human resources management skills and the criteria for judging them are varied and complex; that total organizational agreement on good human resources management is unlikely; that evaluations should be kept as specific as possible to avoid dangerous over-generalizations about overall organizational performance; and that a detailed organizational analysis must be made beyond that outlined in the module.

Included are suggestions for analyzing the problems uncovered through use of the module, a user's guide to the MAPS series, the World Health Organization's classification of health personnel, and a 16-item reference list (1959-81).

113

PN-AAJ-999

MF \$1.08/PC \$11.96

Ecuador case study

Fairman, Harry

Association of University Programs in Health Administration

1981, 92p. : En

931101600; 518001200; 518001500

AID/ta-C-1480

To help improve the management of health, population, and nutrition programs in its host country organizations, A.I.D. in 1977 asked the Association of University Programs in Health Administration (AUPHA) to provide a methodology, subsequently codified into a series of management problem-solving (MAPS) modules, for assessing the management of indigenous health systems. These modules were then used in several in-country consultations, one of which, summarized in this report, sought to design the primary care component of the Government of Ecuador's Integrated Rural Health Delivery System (IRHDS).

AUPHA analyzed the interrelationship of IRHDS with the socioeconomic strategies incorporated in Ecuador's 5-year (1980-84) development plan and the constraints (e.g., lack of institutional capacity, the use of inappropriate technologies etc.) which limited delivery of Ministry of Health (MOH) services to 18.6% of the population in 1977. Through site visits; interviews at the national, provincial, and microregional levels; and document analyses, AUPHA identified a number of priority concerns for the IRHDS: the role of rural health promoters; the supply of basic drugs and of other medical material; the flow and use of statistics in the MOH; and management of provincial MOH offices (in terms of finance and budget, facilities and equipment maintenance, personnel, and technical assistance). On the basis of these summary assessments, AUPHA developed proposals to address IRHDS management needs in the following areas: (1) developing management at the microregional level to effectively acquire and use resources; (2) building provincial management capacity through technical assistance and training programs; (3) improving health service management and national policymaking; and (4) coordinating the MOH and the Rural Development Secretariat to ensure accountability and resource and information flows. Other recommendations for long-term problems include building interagency coordination; making projects accountable to local communities; specifying the functions of rural health promoters; attracting qualified physicians into rural areas; and providing technical assistance to develop self-assessment and project implementation skills.

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PN-AAK-001

MF \$1.08/PC \$10.14

Jordan case study

Bernhart, M.H.

Association of University Programs in Health Administration

1981, 78p. : En

931101600

AID/ta-C-1480

In 1980, an Association of University Programs in Health Administration (AUPHA) team engaged in a consultation to help Jordan's Ministry of Health (MOH) improve its internal management. Against a brief background description of the Jordanian health setting, this report describes the strategic approach used in the consultancy and the method of its implementation.

AUPHA's overall approach addressed the general areas to be affected; targets for change within these areas; the objectives for change that should be set; the sequence to follow in addressing these areas; and methods for achieving change. Also considered in the approach were cultural and bureaucratic impediments to change, the limitations imposed by Jordanian health professionals, and the constraints specific to AUPHA. The objectives set included seven incremental objectives—problem awareness; problem specification; ability to design solutions; design of solutions; knowledge of implementation practices; implementation of the design; and evaluation of the new system, which can be modified, depending on the amount of intervention needed. In implementing this approach, the consultants endeavored to keep costs low; used the same three consultants throughout the project, rather than employ specialized experts; kept inputs brief, in the form of 2 to 4 person-weeks of work every 2-3 months; distinguished between the intangible and functional aspects of management, while addressing both; differentiated among management functions based on degree of routinization in a functional area; minimized externalization so as not to weaken management's role—a key concern was that no methods encourage the belief that the areas dealt with were more the concern of consultants and donors than MOH officials; and gave priority to MOH's expectations above all others.

Although the MOH staff were generally pleased with the approach, the AUPHA consultants make the following recommendations for similar projects: (1) stress team continuity; (2) avoid arbitrary parcelization of responsibilities; (3) provide incentives to involve local institutions; and (4) test consultancy premises for cultural acceptability. The consultants also stressed the need to employ a method that addresses comprehensively preset policy objectives.

Appendices include a resource inventory of MOH field facilities.

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PN-AAK-002

MF \$1.08/PC \$4.03

Guidance for institutional analysis in developing USAID health programs

Emrey, R.C.

Association of University Programs in Health Administration

1981, 31p. : En

931101600

AID/ta-C-1480

Assessment of health services management can provide a fresh perspective on operating activities and insights into ways



of solving organizational problems and bottlenecks. This study—designed for host country health officials and A.I.D. program officers—outlines important tasks for assessing the management of health services in developing countries. The emphasis of these guidelines is on improving local capacity for self-assessment.

The tasks of health management assessment are divided into three major phases: (1) managerial assessment design, involving the selection of qualified and informed planning participants, the specifying of local health sector goals and the areas and/or programs to be evaluated, and the adapting of general assessment tools to the social/administrative region and to the existing level of management complexity; (2) the collection of data relevant to health system management, i.e., the way in which health programs are managed and the social, economic, and political factors influencing managerial performance (a process which requires a staff familiar with the location and assembly of health management data and able to organize it for systematic and rigorous analysis); and (3) the analysis of the data. There are four general methods by which to analyze the data on health management performance. One method involves both managers and staff who, in a dialectical manner, identify and resolve perceived problems. A second method is the analysis by independent evaluators of data gathered from questionnaires administered to managers and staff. A third alternative is to submit the findings to an impartial expert panel for evaluation. The fourth option is to conduct ongoing evaluations of the actual changes brought about through the implementation of recommendations. After presenting illustrative alternative arrangements for incorporating the various participants in the assessment process, the author concludes that the key element for successful analyses is the willingness of operating managers to support and, if possible, to participate in the assessment of their organizations.

Included among the appendices are pertinent citations on project management from the A.I.D. Handbook and a 6-item (1975-81) reference list.

116 **PN-AAK-003**
MF \$1.08/PC \$5.46

Towards problem solution: options analysis and implementation

Brown, G.D.; Kaluzny, Arnold D.; Feirman, Harry
Association of University Programs in Health Administration
1981, 42p. : En
931101600
AID/ta-C-1480

When faced with problems in health care programs, managers often do not know how to choose or implement the most appropriate and feasible solution. To assist developing country health managers in this regard, this report, one of the Association of University Programs in Health Administration's problem-solving (MAPS) modules, traces in workbook fashion the processes of problem analysis, development and selection of solutions, and solution implementation.

After identifying health problems, various options for resolving the most important ones must be developed. This process involves reviewing the program's inputs (i.e., personnel, facilities, drugs, materials, and information flows) and weighing each input's quantitative and qualitative deficiencies (e.g., whether acquiring additional doctors is better than simply implementing new training courses for the present staff). The health manager must then choose which solution would best solve the identi-

fied problem and arrange hierarchically all the activities necessary to reach that solution. To select the most appropriate of available solutions, each solution should be assessed in terms of how well it resolves the particular problem and its perceived costs in time, personnel, and money. Among the tools used for such an assessment are contingency analysis, scenarios, the delphi technique, benefit cost ratios, internal rate of return, and cost benefit analysis. Successful implementation of the chosen solution depends on how much control the manager and the manager's organization have over the process and the resources necessary to implement the solution. For actual implementation, the health manager must identify and overcome implementation constraints and be willing to take personal and organizational risks. To determine the appropriate implementation strategy, the manager must assess the extent to which participants agree on the proposed change, select the proper method for creating consensus, and determine what is necessary to overcome the constraints.

Included is a method for collecting and analyzing the information needed to manage the implementation of a decision. Appended is a 9-item (1974-81) list of references.

117 **PN-AAK-004**
MF \$2.16/PC \$25.09

Management development exercises: problem-solving processes used by the Ministry of Health in Jordan

Bernhart, M.H.; Quintana, Olga
Association of University Programs in Health Administration
1981, 190p. : En
931101600
AID/ta-C-1480

The Association of University Programs in Health Administration's (AUPHA) management-problem solving (MAPS) modules were developed through a series of consultations aimed at resolving real problems of health system management in developing countries. This adjunct to the MAPS series reports on AUPHA's consultation with Jordan's Ministry of Health (MOH) and presents a series of 13 processes used in the consultation.

An initial section presents a model for using available and limited data to identify the components in health system assessment—defining health needs, setting feasible goals and performance levels, and evaluating program performance. Remaining sections describe the management development exercises used by the AUPHA team to train the MOH in the following areas: (1) categorizing and characterizing information systems to choose those best meeting user needs; (2) examining the three objectives of the supervision process—to ensure compliance with organizational requirements, to help workers maintain their professional skills, and to motivate workers to pursue organizational goals—and exercises for their implementation; (3) decisionmaking in regard to personnel, finance, and operations; (4) a health administrator's solving of in-basket problems; (5) preparing a job description; (6) taking an inventory of resources to determine which are available and which are not being fully utilized; (7) programming resources to meet organizational objectives; (8) the incentive system, including incentives and disincentives, motivation, assessing self-development opportunities, and goals; (9) accounting and budgeting; (10) deviations in expected outcomes due to changes in services, miscalculations of workload, inefficient operations, or



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emergency situations; (11) the flowcharting of accounting procedures; and (12) designing an accounting system.
Appended are four references (1975-81).

118

PN-AAK-119

MF \$1.08/PC \$9.36

Primary health care issues: growth monitoring

American Public Health Association
1981, 72p. : En
936590000
AID/DSPE-C-0053

Growth monitoring (GM) of a child's nutritional status is an effective means of targeting appropriate curative and preventive intervention in occurring or predicted cases of malnutrition. This state-of-the-art review of GM shows planners how to maximize the benefits of GM through the use of anthropometric indicators, nutritional status classification systems, record-keeping systems, measurement tools, program organization, family education and the training of primary health care workers.

An analysis of commonly used anthropometric indicators for GM reveals that weight-for-age most inclusively identifies children with mortality risk, while weight-for-height provides the most accurate picture of intervention effectiveness. Systems designed to classify children as adequately or inadequately nourished should be compatible with the clinic's available resources and promote client and staff morale. Planners are shown how to select recording systems (cards and growth charts) which are intelligible to workers and clients while facilitating community and regional profiles. Eight measuring instruments (arm circumference tape; locally produced, single beam "clinic", free hanging, dial spring, and tubular spring scales; length/ height boards; weight/height charts) are evaluated and rated for standardization, ease of use and repair, taring, durability, readability, nonthreatening appearance, cost, and portability. Guidelines for establishing periodicity, selecting participants, setting up monitoring sessions, targeting recipients of food programs, and supporting community and family initiatives are specified for the community, family, and program managers. Planners are encouraged to teach improved nutrition through strategies which ensure mothers' active involvement in all GM activities. A section on training workers describes responsibilities and the accompanying skills needed to effectively establish GM activities, educate mothers, stimulate community participation, and record information that will help evaluate the program. Finally, the value of using GM programs to identify nutrition problems geographically and monitor program impact on the target population and, in general, as a way of helping communities to identify, solve, and prevent nutrition problems is presented.

A 138-item bibliography (1946-81) and two appendices on GM tools are included.

119

PN-AAK-131

MF \$1.08/PC \$.52

Incidence, prevalence, and scale of blinding malnutrition

Sommer, Alfred; Hussaini, Gusti; Tarwotjo, Ignatius; Susanto, Djoko; Soegiharto, Tito
Johns Hopkins University. International Center for
Epidemiologic and Preventive Ophthalmology
The Lancet, 1981, 1407-1408p. : En
931004500
AID/DSAN-CA-0267

Although corneal xerophthalmia (CX) is a major public health problem in many developing countries, its magnitude has been difficult to assess due to the lack of established information. This report presents the combined findings of longitudinal and cross-sectional survey field experiments conducted to determine the incidence of CX in Indonesia.

A longitudinal field survey of 4,945 pre-school age children in West Java was conducted quarterly from 1977-79. This was combined with a random, multistage cluster probability survey done in 23 of Indonesia's 27 provinces (27,084 children surveyed). After calculating high and low incidence figures, the true incidence rate was estimated at 5/1000/yr (95% confidence limits, 2.6-7.5/1000). Calculation of prevalence rates was based on the number of children actually examined. The average prevalence of active CX during the longitudinal study was 12/10,000; whereas the average weighted prevalence of active CX for rural Indonesia as a whole was 6.4/1000, 53% of that of the longitudinal study area. Since the active stage of CX is a transient condition not expected to increase significantly, and since prevalence rates in the West Java villages were not very dissimilar to those in the country at large, the report assumes that spontaneous cure rates and differential mortality (between children with and without CX) in the two study groups were also similar. The incidence rates of the two groups should, according to the authors, also be proportional to their respective prevalence rates. Thus, at 53% of the rate for the longitudinal study, the annual incidence of active CX in rural Indonesia is 2.7/1000 or at least 63,000 new CX cases/yr.

Extrapolation of the data suggest that CX is at least as common in India, Bangladesh, and the Philippines as it is in Indonesia, bringing the total number of new CX cases/yr in these four countries to 500,000. One-third to one-half of the cases, the authors conclude, will result in bilateral blindness while the number of children with milder manifestations (e.g., night blindness, Bitot's spots, etc.) is probably ten times that of active CX cases.

A 15-item list of references (1963-80) is appended.



120

PN-AAJ-669

MF \$1.08/PC \$11.44

A study of the progressive development of three low cost housing projects in Panama

U.S. Agency for International Development. Bureau for Development Support. Office of Housing
Occasional Paper Series, 1980, 86p. : En

The progressive or "minimalist" view of low-cost housing—that the poor, if given a base on which to build, will eventually have adequate housing—finds support in this study of three low-cost housing projects in Panama City, Panama. Described in the study are the history of the three projects, the physical attributes of the houses built, the socioeconomic characteristics of the target populations, and the changes that occurred in the project communities.

The first two projects provided serviced lots and piso-techo units (shell houses with cement foundations, zinc roofs, and a sanitary core unit) and were begun over 10 years ago, offering a unique opportunity to see how the housing stood up over time. The third project provided core units (enclosed units similar to the piso-techo units, but with electrical outlets and a multi-purpose sink) and was implemented in stages, permitting assessment of the level of beneficiary investment.

The study's major findings were as follows. (1) In the two earlier projects, 90% of the sites were improved and the majority of structures were rated adequate to good in terms of size of constructed area, number of rooms and of persons per room, durability of materials, state of repairs, and service levels for water and sewerage, as compared with full-size units constructed for higher-income groups. (2) Housing projects are long-range solutions and their complete development requires about a decade. By this standard, the third project is progressing adequately. (3) Self-help construction was widespread in all three projects, although credit, as opposed to savings, was used far more often in the third project. (4) All three projects reached their target populations. (5) The vast majority of participants in the first two projects were able to cancel their mortgages. (6) Over half the families still plan major revisions despite the high level of construction and quality of housing. (7) The two early projects had high numbers of households headed by women, reflecting selection criteria more flexible than exist currently. (8) The two early projects have fairly high levels of community services which compare well with services in newer areas.

121

PN-AAK-014

MF \$2.16/PC \$23.01

A technical manual for erosion and sediment control in urban areas of developing countries

Boyer, J.G.; Avalos, J.A.; Gabele, P. R.
National Savings and Loan League
1980, 177p. : En
9120468091
AID/otr-C-1453

Uncontrolled storm runoff in rapidly growing urban areas of the tropics is severely constraining land development, reducing groundwater reserves, and hastening soil erosion. This manual provides practical guidelines and technical materials to assist A.I.D. and host country officials engaged in land development projects to prevent such uncontrolled storm runoff.

Section I provides the basic procedural methods and guidelines needed to incorporate erosion and sediment control—

essential to reducing the destructive effects of runoff—into the planning, design, and construction of a project. Critical management decisions and construction field practices which should be included in effective erosion and sediment control programs are presented in Section II. Section III describes and recommends specific control strategies for five typical runoff-related problems involving steep or long gradual slopes, street and adjacent ditch drainage, waterways and streams, site and lot grading, and infrastructure. In Section IV, the authors summarize the basic design criteria which should be considered in planning the utilization of a prospective site with regard to stormwater drainage. Finally, Section V presents the technical guidelines needed by site planners, engineers, and construction personnel to ensure the proper use, design, construction, and maintenance of the most commonly used erosion and sediment control devices.

The manual is highlighted by diagrams and tables. Appended are designs for a sediment basin and a pipe spillway, runoff coefficients for use in a formula measuring watershed runoff, Manning coefficients for a formula to measure discharge, data on parabolic channel design, and symbols used in erosion and sediment control practices.

122

PN-AAK-027

MF \$2.16/PC \$25.22

Clandestine development in Colombia

Blaesser, B.W.

U.S. Agency for International Development. Bureau for Science and Technology. Office of Housing
Occasional Paper Series, 1981, 192p. : En

In South American developing countries, the "pirate" submarket, in which purchasers obtain apparent proof of land title in violation of municipal regulations (subdivision approval, zoning laws, and service requirements), accounts for a significant portion of low-income settlements. This study analyzes the pirate submarket in Medellin, Colombia from an economic, legal, and institutional perspective through the use of case studies (El Diamante and La Cascada) and other documents. Comparison is made with the pirate submarket in Bogota, and with legal alternatives, particularly the government-sponsored minimum standards housing submarket.

It is suggested that strong housing demand and Medellin's rigid urban housing perimeter policy and high technical standards for land classification, subdivision, and provision of services have fostered pirate settlements. Although limited land supply and criminal sanctions have reduced the rate of illegal subdivision, smaller pirate settlements continue in semi-rural areas. The appeal of these settlements to low-income buyers is based on the inability of legal markets to provide the opportunity to build or expand houses incrementally, along with installment purchase and sale arrangements suitable to low-income buyers.

Pirate subdividing could potentially satisfy public policy concerns—especially in infrastructure costs—if an adjustment can be made to the legal-institutional framework governing the land subdivision process to provide low-income families access to land and housing. Proposed modifications include credit programs, protection for the land buyer should the subdivider fail to provide clear title or services, eliminating or simplifying the reporting requirements for minimal standards subdivisions, and a more streamlined approval process.

A recent credit program established by the Central Guarantee Foundation provides institutional help and guaranteed loans to low-income families who form community associa-



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tions. Severance fund (cesantias) mortgages could provide another source of credit to low-income workers.

Five appendices, including a brief description of the pirate subdivision in Castilla Vieja, and a 22-item bibliography in English and Spanish (1964-78) complete the study.

123

PN-AAK-030

MF \$1.08/PC \$5.07

Housing development in Nigeria

Chaterjee, Lata

U.S. Agency for International Development. Bureau for Science and Technology. Office of Housing
Occasional Paper Series, 1981, 38p. : En

A sound housing policy can greatly promote the socioeconomic well-being of Nigeria's poor. This study discusses the multiple roles of housing in Nigeria's economy and identifies key issues to be incorporated in the development of such a policy.

Against a background discussion of the emerging focus of development philosophy on a basic needs approach to housing, the role of housing in the Nigerian economy is analyzed from five points of view: housing as a consumption good; the effect of housing in augmenting productivity in the resident labor force; housing as a source of employment and income generation; the impact of housing on capital formation; and housing as a macroeconomic factor.

Construction in Nigeria is crucial to both the housing sector and the economy, contributing to both GNP and to gross fixed capital formation at an increasing rate in recent years.

Quality of housing ranges from spacious homes to crowded slum dwellings. The main types of housing are distinguished by construction materials, and the use of a specific type depends on regional differences in climate—highlighting implications for planning material standards for housing. Quality of housing also incorporates factors such as sewerage services, water closets, and electricity, and data indicate that housing and access to services increases with family income.

Data suggest that Nigerians spend a smaller proportion of their income on housing than in most developing countries, but data omissions make these atypical figures suspect. Of serious concern in urban areas is the gap which exists between current housing production costs and the ability of low-income families to pay for housing. Although the situation may improve in the long run with rises in income, the short-term need is to reduce production costs and make housing more accessible to the poor. A policy toward achieving this goal should include choosing housing material standards which are more appropriate for a particular region, improving land management and efficiency in both the building and housing production sectors, and increasing access of the poor to financing.

Included is a 19-item bibliography (1955-1981).

124

PN-AAK-036

MF \$2.16/PC \$15.47

Mejoramiento de las viviendas rurales en la Republica Dominicana para resistir los huracanes y terremotos (Improvement of rural dwellings in the Dominican Republic to resist hurricanes and earthquakes)

U.S. Agency for International Development. Bureau for Science and Technology. Office of Housing
1981, 118p. : Sp
English edition: PN-AAJ-798

Devastation wrought by hurricanes and earthquakes causes serious housing shortages and high reconstruction costs in the Dominican Republic (DR). This study offers alternative construction methods and housing design modifications to improve the resistance of the DR's rural housing to natural disasters and to make housing more accessible to the rural poor.

The five traditional styles of housing (palm leaf; wood, cane, and mud; concrete on a wood structure; palm wood; and concrete blocks) are analyzed for weaknesses caused by poor design or construction, bad work quality, low building material resistance (e.g., palm and wood structures are easily damaged by winds, cement block structures are damaged by earthquakes), and vulnerable locations (e.g., on the sea front).

Maps, pictures, and diagrams depict the devastation wrought on houses and suggest alternative construction methods (e.g., the use of more cement and braces). For protection against earthquakes, home builders should choose a flat location in a non-fault zone with a rock bed and good drainage. To avoid the devastating impact of hurricanes, houses should be built on high ground away from coasts and lakeshores and sheltered behind natural barriers such as wooded areas.

The study also presents the cost and local preferences for building materials in each area of the DR; the functions of the carpenter and bricklayer in rural construction; and the economic, sociological, and technical considerations which must be incorporated into all attempts to modify housing structures.

A recommended 5-year proposal to the DR Government includes: (1) selecting organizations that can execute and be responsible for promotional and training activities; (2) involving financial institutions and banks in the financing of construction activities; (3) providing local builders with theoretical and practical training along with concrete opportunities to apply their skills; and (4) creating a demand for improved housing through public meetings, posters, and radio and school programs.

A 31-item list of references (1961-80) and appendices on training programs and construction materials are included.

125

PN-AAK-380

MF \$1.08/PC \$7.28

Morocco shelter sector assessment

National Savings and Loan League
Aug 1981, 56p. : En
912046800
AID/otr-C-1453

The Government of Morocco's (GOM) shelter plan for 1981-85 identifies a housing deficit of 700,000 units nationwide, half of them among the urban poor. This shelter sector assessment analyzes the plan in terms of its target populations and the GOM shelter delivery system.

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The plan calls for spending \$233 million to upgrade urban slums—a GOM priority since the mid-1970's—in larger (\$163 million) and smaller cities (\$70 million). Other priorities include a program to build 15,000 shelter solutions in 300 market towns at a cost of \$184 million; a Programme Social budgeted at \$650 million to provide units to families with monthly incomes of \$155-388; an Habitat Bon Marche program costing \$441.5 million to procure 200,000 lots for eventual construction of apartments; and a mixed shelter program spending \$22.5 million to construct 1,500 units in the Sahara.

The authors proceed to offer background information on the Moroccan population and discuss: settlement patterns; urbanization trends regarding small towns, intermediate centers, and grandes villes; migration patterns; and urban, as well as rural, living conditions. A summary of the socioeconomic conditions of the target population—income, expenditures, and employment—follows.

After assessing the GOM's shelter delivery system in terms of institutional responsibilities, infrastructure institutions, production, and costs and financing, the authors conclude that there are serious constraints to the successful implementation of the plan. (1) The \$322 million annual cost appears beyond the GOM's means. (2) GOM financing lacks flexibility and is spread across a wide range of income levels (e.g., families in the 70 percentile income group are eligible for subsidies). (3) Land development activities have been steeply taxed. (4) Land ownership and control is complicated by a mosaic of laws and regulations. (5) Donor support, although large, depends on poorly defined funding mechanisms. (6) Finally, the cost of housing and building materials is high in Morocco while skill levels are low.



The Moroccan Government has earmarked \$233 million and is receiving support from A.I.D. and other donors to upgrade this and similar urban slums—"bidonvilles"—in both large and small cities.



Food, nutrition and agriculture: guidelines for curriculum content for agricultural training in Southeast Asia

Harper, L.J.

1981, 146p. : En

Cooperatively sponsored by FAO and AID

931083100

RS/USDA-01-74

Educating farmers in the relationship between agricultural production and human nutrition has been suggested as one way of resolving the paradox currently occurring in Southeast Asia of simultaneous increases in food production and malnutrition. This report presents guidelines for a one semester undergraduate course in human nutrition for students and teachers of agriculture and for in-service training of agricultural extension workers in Indonesia, Malaysia, the Philippines, and Thailand.

The objective of the course is to help future extensionists, as members of the rural development team, to better assist farmers in growing food sufficient in quantity and quality to meet family nutritional needs and to increase farmer income. The course covers 11 topics grouped into five broad areas: (1) the relationship between agricultural production, food availability, nutritional status, and health; (2) the nutritional value of different foods and their relationship to human nutritional requirements and methods of evaluating human nutritional status (including indicators of undernutrition and malnutrition); (3) the impact of various food and agricultural systems (i.e., food processing, storage, and distribution) on nutritional status and ways to improve such systems; (4) the organization and operation of community- and national-level food and nutrition programs and the methodology of nutrition education; and (5) planning, implementing, and evaluating agricultural programs designed to improve the nutritional and economic status of farm families, including ways to coordinate the efforts of national and community agencies.

Provided for each topic are a list of performance objectives for students, an outline of topics to be covered, and practical notes on how teachers can approach these topics. The author cautions, however, that these guidelines must be carefully tailored to meet both specific needs in the subject area addressed and the participants' educational level.

Appended are a guide to sources of nutrients; notes on vitamins; a list of the nutrient content of selected foods; recommended nutrient intake; a 13-item reference list (1966-80); and a summary of a workshop, Integrating Nutrition into Agriculture, held 1/12-16/80 in Laguna, the Philippines.

Breast is best: an international bibliography on breast feeding and infant health

Baumslag, M.; Grace-Mason, L.; Roesel, C.; Sabin, E.

U.S. Department of Health and Human Services. Public

Health Service. Office of International Health

2nd ed. 1980, 140p. : En

Revises 1979 edition: PN-AAH-148

RS/HEW/OIH/01-77

It has been estimated that of the 15 million developing country children under age 5 who die each year from the combined effects of malnutrition and infection, as many as 10 million could be saved if breast-feeding was generally practiced. Despite the clear nutritional and immunological advantages of human breast milk, however, the practice of breast-feeding is declining in many developing countries. A key factor may be lack of proper information on breast-feeding by health professionals.

To redress this problem, this international bibliography on breast-feeding and infant health provides information needed for a better understanding of the technical and social aspects of breast-feeding as well as a framework for coordinating nutrition and health planning efforts in developing countries. Annotated bibliographic entries are grouped according to seven categories: (1) maternal nutrition; (2) breast-feeding practices; (3) support and promotion of breast-feeding; (4) composition of human breast milk; (5) impact of feeding practices on morbidity and mortality; (6) breast-feeding and reproduction; and (7) infant formula and weaning foods.

The authors identify the following basic themes of the bibliography: (1) The mother's health and nutritional status is critical for infant health, in particular for infant birth weight, sufficient lactation calories, and adequate amounts of breast milk. (2) Breast milk alone, from adequately nourished mothers, is sufficient food for infants up to 6 months of age. (3) Providing extra food for mothers to help ensure sufficient breast milk volume is cheaper than providing breast milk substitutes for infants. (4) Mothers need encouragement, support, and proper knowledge (which is often not supplied in developing country maternity wards) in order to breast-feed successfully. (5) The use of birth control pills (which contain high estrogen levels), a lack of lactation calories in pregnancy, and maternal malnutrition while nursing can all reduce lactation, adversely affecting breast milk production. (6) Breast milk is a useful supplement to weaning food during a period in which high caloric intake is paramount to a child's growth and development.

Nutrition intervention in developing countries; study I, supplementary feeding

Anderson, M.A.; Austin, James E.; Wray, J.D.; Zeitlin, M.F.

Harvard University. Institute for International Development

1981, 225p. : En

Set contains seven studies in five volumes: Study II, PN-AAK-105; Study III and IV, PN-AAK-107; Study V and VI, PN-AAK-109; Study VII, PN-AAK-469

931083800

AID/ta-C-1311

Although nutrition projects such as supplementary feeding programs (SFP's) are usually conducted with the best of intentions, failure at the design stage to consider overhead, social costs, and long-term consequences often make them only marginally effective. To help redress this deficiency, this study provides guidance to planners designing and evaluating SFP's in developing countries.

SFP's alleviate nutritional deficiencies for over one billion preschool children and pregnant and lactating women—who are particularly vulnerable to malnutrition and related illnesses—and often offer maternal nutrition education. Nonetheless, SFP's can only meet immediate, short-run nutrition

needs and thus can never substitute for income-increasing and redistributive measures or long-term solutions to food needs.

Three common types of SFP's are described: (1) nutrition rehabilitation centers, which provide entire nutrient needs and medical attention for severely malnourished children but are high-cost and thus relatively few in number; (2) on-site feeding programs, which provide a daily meal to preschoolers, often in combination with day-care or health services; and (3) take-home programs, the most common type of SFP, which provide food for home consumption by targeted beneficiaries who, however, often share the food with others in the family.

The bulk of the study identifies major considerations in designing SFP's in terms of community involvement, participant selection, food type, food quantity, time dimensions, location, site facilities, logistics, and control of managerial processes. Evaluation should be an integral part of SFP's and should include systematic collection of data on costs and targeted nutritional effects (detailed by the authors) as measured by anthropometric methods compared to growth standards, e.g., weight-for-height.

Case studies of SFP's in Pakistan, India, Colombia, Costa Rica, and the Dominican Republic are provided to illustrate program design considerations and the importance of baseline data, control populations, and coverage of the target population. A 187-item bibliography (1956-81) is included.

129 **PN-AAK-105**
MF \$4.32/PC \$47.32

Nutrition intervention in developing countries; study II: nutrition education

Zeitlin, Marian F.; Formacion, C.S.
Harvard University. Institute for International Development
1981, 363p. : En

Set contains seven studies in five volumes: Study I, PN-AAK-104; Study III and IV, PN-AAK-107, Study V and VI, PN-AAK-109, Study VII, PN-AAK-469

931083800
AID/ta-C-1311

Long-term nutrition goals are dependent on nutrition education programs (NEP's) to teach people to make better use of available food resources. This study provides guidelines for planning, implementing, and evaluating NEP's in developing countries.

Although NEP's are designed for areas where malnutrition is a product of poor feeding and health practices, but are they ineffective below a certain poverty threshold where resources are unavailable for improved nutrition? Approximately 90% of NEP's are integrated into general health services targeting pregnant and lactating women, mothers of weanling children, and school children, while other Although NEP's are directed at politicians, doctors, commercial advertisers, and others involved in social welfare and food delivery systems.

NEP's are often ineffective because designers consider them to be a token health activity and do not incorporate key design considerations such as problem diagnosis; definition of target group and goals; community involvement for cultural acceptance, resource mobilization, and local management; strategies favoring attitude and behavior changes (e.g., commercial advertising, price shifts); message design (assessing actual food beliefs and practices when elaborating priority themes); and materials preparation. This study analyzes each of these considerations in detail and discusses means of transmitting nutrition messages through such channels as: (1)

nonformal face-to-face education; (2) mass media; (3) adult literacy programs; (4) schools; (5) professional schools and training programs; and (6) educating policy makers (e.g., field visits to clinics).

Few evaluations have measured the cost-effectiveness and nutritional impact of NEP's, although indirect evidence indicates that NEP's have effectively improved the nutritional status of weanling children. Time, materials, travel, distribution, and broadcasting must be used to estimate future costs, while beneficiary knowledge, attitude, behavior, and nutritional status should be used as effectiveness indicators.

An NEP case study using radio spots in the Philippines to teach mothers to enrich their infants' rice porridge is included along with a 346-item bibliography (1953-79).

130 **PN-AAK-107**
MF \$4.32/PC \$38.87

Nutrition intervention in developing countries: study III, fortification; study IV, formulated foods

Austin, James E.; Zeitlin, Marian F.; et al
Harvard University. Institute for International Development
1981, 2v.in 1 : En

Set contains seven studies in five volumes: Study I, PN-AAK-104; Study II, PN-AAK-105; Study V and VI, PN-AAK-109; Study VII, PN-AAK-469

931083800
AID/ta-C-1311

Food fortification and formulated foods are two important types of nutrition programs in developing countries. Presented here are two studies on the design, evaluation, and impacts of such programs.

The first study analyzes food fortification programs (FP's) which primarily address micronutrient deficiencies, e.g., using salt to carry iodine and carriers such as sugar and tea to carry vitamin A. Iron and protein FP's appear to be increasing but have not been widely used as yet. The ease with which nutrients can be incorporated into diets without major changes in consumption patterns facilitates the implementation of FP's. Primary considerations in designing an FP are nutrient need and quantity and the choice of carrier and fortification level. Regional, seasonal, and geographic factors affecting nutritional status must also be considered. Monitoring of an FP's nutritional impact is essential. A comparison of FP's and alternative interventions (such as mass doses of nutrients by tablet or injection) shows that FP's, although not indicated in all situations, usually have higher permanent benefits and reach more people. A case study of a vitamin A FP in the Philippines analyzes nutritional need, alternative approaches, research design, program design, and evaluation. A 138-item bibliography (1942-79) is appended.

The second study specifies key elements to be considered when designing and employing formulated food programs (FFP's) in developing countries to help prevent protein-calorie malnutrition in weanling children. Formulated foods are nutrient-dense supplements which can be produced in the home or village or by industry. Designing an FFP requires decisions about nutrient content and balance, raw material supply, processing, digestibility, consumer acceptability, distribution, and pricing. Subsidizing FFP's may be necessary as the main barrier to their success has been high consumer prices. FFP's that received strong political and financial support have successfully alleviated malnutrition among needy children. A case



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study of a home-based, community-level FFP and accompanying nutrition education program in Upper Volta is presented. Included are a 175-item bibliography (1956-78) and five appendices on FFP's and the Yako and Koupele people of Upper Volta.

131

PN-AAK-109

MF \$3.24/PC \$28.21

Nutrition intervention in developing countries: study V, consumer food price subsidies; study VI, agricultural production, technical change, and nutritional goals

Austin, James E.; Zeitlin, Marian F.; et al
Harvard University. Institute for International Development
1981, 2v.in 1 : En

Set contains seven studies in five volumes: Study I, PN-AAK-104; Study II, PN-AAK-105; Study III and IV, PN-AAK-107; Study VII, PN-AAK-469

931083800
AID/ta-C-1311

The two studies in this volume analyze the impacts of agricultural and food price subsidy policies on the nutritional status of the poor.

The first study examines elements in designing food price subsidies (FPS's). Because FPS's have historically been implemented for economic or political rather than for nutritional reasons, the feasibility of targeting such programs to the poor remains untested. In designing an FPS, it must be decided whether to include a specific food choice, subsidize all or part of the supply of a food, and limit beneficiaries. Direct subsidies (e.g., to producers) avoid the market distortions of implicit subsidies (e.g., rationing) but can require expenditures of up to 30% of national budgets. Direct costs can be controlled through effective targeting, rationing, careful selection of subsidized foods, and the use of existing marketing and distribution systems. Indirect costs can be controlled by separating the consumer from the producer price and minimizing market distortions. The effectiveness of FPS's can be measured by percentage of family intake subsidized, increase in family nutrient intake, control group comparisons, and anthropometric indices. Case studies of ration shops in Pakistan and subsidized milk distribution in Mexico are included and 60 references (1922-79) are provided.

The second study analyzes the impacts of developing countries' agricultural policies (AP's). AP's can increase target population food consumption if they are designed to increase incomes and lower food prices. For prices to decrease, rises in domestic food production must be accompanied by price and trade policies that support supply expansion. Food price control is often the most effective way to improve the short-term nutrient intake of needy families, but long-term effects depend on AP's that generate employment and income, such as those that support labor-intensive as well as mechanized agricultural inputs. Because of the wide-ranging impacts of AP's, a comprehensive, carefully phased strategy is needed to minimize the dangers inherent in attempting both to foster farm production and to provide price subsidies. Included is a case study of the nutritional impact of a project to provide improved technology to small farmers in Colombia. An 82-item reference list (1958-79) is appended.

132

PN-AAK-469

MF \$3.24/PC \$34.97

Nutrition intervention in developing countries; study VII, integrated nutrition and primary health care programs

Harvard University. Institute for International Development
1981, : eN

Set contains seven studies in five volumes: Study I, PN-AAK-104; Study II, PN-AAK-105; Study III and IV, PN-AAK-107; Study V and VI, PN-AAK-109

931083800
AID/ta-C-1311

Integrated nutrition and health care programs can reduce high levels of morbidity, mortality, and fertility more effectively than can single-faceted programs. This study serves as a guide to planners in designing and evaluating integrated programs (IP's) which address nutrition, health, water/sanitation, and fertility needs. The rationale for IP's lies in the biological and social linkages that exist between health, nutrition, and fertility, and the efficiencies that can be achieved through coordinated organizational facilities, personnel, and services.

IP's generally develop through the reorganization (at the national, regional, and community levels) and reorientation of ongoing programs. This reorientation should be based on an analysis of the community's diagnosed and felt needs, available resources, logistics, and short-and long-term IP objectives. The latter should be kept flexible to accommodate program changes and to avoid excesses in institutional and personnel capabilities. In recruiting IP personnel, especially village-level integrated workers (VIW's), it is important to consider how VIW's are selected and trained, their responsibilities and needs for technical and supervisory support, and the ratio of VIW's to clients.

The study identifies key health services that appear most effective in improving: children's nutritional status (e.g., antiparasite measures); water and sanitation (e.g., waste disposal); and family planning services (e.g., sterilization). A plan for evaluating IP's on the basis of costs and effective use of resources is detailed. Despite difficulties in measuring IP effectiveness due to their multi-faceted orientation, IP's appear to produce impressive reductions in mortality rates of infants and preschoolers.

Major barriers to establishing effective IP's are personnel overload, problems with replicability, institutional resistance, and political factors. Case studies of preschool IP's in Ghana and Lesotho and village-level IP's in India illustrate the complexity of implementing such programs.

A 291-item list of references (1948-79) is appended.



133

PN-AAK-009
MF \$1.08/PC \$10.27

Illustrative analysis: socio-economic differentials in cumulative fertility in Sri Lanka - a marriage cohort approach

Little, R.J.A.; Perera, Soma
International Statistical Institute. World Fertility Survey
WFS Scientific Reports, no.12, 1981, 81p. : En
931054700
AID/csd-3606

Given a dramatic decline in fertility over the past three decades in Sri Lanka, policymakers wished to determine whether fertility had declined equally among different socioeconomic, ethnic, and regional groups. Hence, a cohort analysis of fertility differentials (FD's) was performed using data from the 1975 Sri Lanka World Fertility Study.

Women respondents were divided into three cohorts defined by the number of years married—20 or more years, 10-19 years, and less than 10 years. Each group's fertility rates were differentiated according to ethnic group (four major ones exist), zone of residence (six were delineated), category of residence (rural, urban, or tea/rubber plantations), education, religion, and husband's occupation.

The study's main conclusions are: (1) Marital fertility decreases as age at the time of marriage increases. Further, many of the socioeconomic differentials can partially be traced to variations in the distribution of age at marriage. (2) Not until the second decade of marriage do considerable FD's emerge. The pattern of FD's by region, ethnic group, and work status is markedly different for those married 20 or more years and those. In contrast, the pattern of FD's by respondent's education, husband's occupation, and standard of living is broadly similar for both groups. (3) FD's between zones are largely due to differences in racial composition, urbanity, and socioeconomic factors. (4) Important FD's among ethnic groups are also evident in the second decade of marriage due mainly to culturally induced increases of age at marriage. (5) Urban/rural FD's are small, although urban rates are generally lower. (6) The effects of standard of living, husband's occupation, and education on FD's are positive but greatly attenuated after controls for age at marriage are applied. (7) Women who work before and after marriage (except those working and living on plantations) have a high socioeconomic status and age at marriage, which account for their low fertility. However, women who work after marriage but not before, achieve low fertility despite their low socioeconomic status and age at marriage. Statistical data are appended.

134

PN-AAK-011
MF \$1.08/PC \$5.33

Breastfeeding

Ferry, Benoit
International Statistical Institute. World Fertility Survey
WFS Comparative Studies, Cross National Summaries, no.13, 1981, 43p. : En
931057000
AID/csd-3606

To help researchers determine more precisely the inhibiting effect of breastfeeding on fertility, this report presents and analyzes data from 19 Asian and Latin American countries responding to a World Fertility Survey questionnaire on BF levels and patterns.

Patterns for the two continents contrast markedly for both the last closed birth interval and the open interval. The median duration of breastfeeding is generally 1-2 years in Asia and 6 months in Latin America (except for Peru). Surprisingly, breastfeeding duration did not differ according to the child's sex even in countries where male children are preferred.

The survey partially solves the complex problem of linking breastfeeding with mortality by restricting some analyses to surviving children. Much more work is needed in this area, however. The data's doubtful reliability, e.g., as evident in the different biases obtained for the open and closed intervals, makes it difficult to analyze breastfeeding trends in detail, as does restricting analysis to demographic variables.

Also discussed is a method employing data on the current breastfeeding status of children born in the recent past, including the open, the last closed, and even prior intervals. Disadvantages of this method include the inaccurate imputation of children's birth dates; the use of the child as the unit of analysis, causing duplicate representation of most fertile women; and heightened sampling variability. Other complications, specific to the closed interval analysis, include the unexplained longer duration of breastfeeding for older women.

Future needs include developing techniques to identify and measure phenomena more precisely and conducting comparative analysis of the impact of breastfeeding duration on birth intervals—a question which survey data from 20 additional countries should help clarify. Further study is also needed on the impact on birth intervals of related factors, e.g., contraception and post partum amenorrhoea. The authors note that changes in fertility levels and patterns necessarily include changes in intermediate variables and so recommend that population programs examine the only partially understood biological and sociological factors underlying observed fertility behavior. Numerous figures and charts are included.

135

PN-AAK-121
MF \$1.08/PC \$10.53

Burundi: les effets des facteurs démographiques sur le développement social et économique (Burundi: the effects of demographic factors on social and economic development)

the Futures Group
1982, 79p. : Fr
932063700
AID/pha-C-1195

If Burundi's current fertility rate of 6.3 children per woman continues unabated, the country's population of 4.1 million will quadruple by 2025 and put an enormous strain on the Government of Burundi's (GOB) ability to meet even the most basic needs of its people. This report presents, against a background of demographic data, the effects of Burundi's population growth on the GOB's development plans in six major areas. Two scenarios for the year 2010 are presented for each area: Scenario A—the continuance of Burundi's current fertility rate; and Scenario B—the diminution of the fertility rate to 3 children/woman by the year 2000 (leading to only a doubling of the population by 2025).

In agriculture, among the projections of Scenario A are a reduction of the average farm size from 1.1 to 0.7 ha and a 2.1 million ton shortfall in basic food commodities. In Scenario B, average farm size will remain constant, and despite a small shortfall in basic food commodities, the GOB will still be able to



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meet its citizens' basic caloric needs. In employment, by 2010, Scenario A predicts a shortfall of 89,000 jobs per year; Scenario B predicts a nearly equal ratio of jobs to job-seekers. Also, gross domestic product per capita is expected to be BIF 21,000 more under Scenario B than under A.

The GOB's goal in education is free and public primary education for all children (currently only 23% of school age children attend). The cost for schools, teachers, and supplies to implement this goal by 2010 will be BIF 41 billion higher under Scenario A than under B. In the health sector, the GOB seeks to increase life expectancy and provide basic health care to all its citizens. Under Scenario A, the GOB's health program will cost BIF 1.3 billion but only BIF 900 million under B. Urban population will grow from 200,000 to 1 million under Scenario A, but only to 700,000 under B. Under either scenario, the GOB's population redistribution program should keep the northern sector of the country from being subject to the disproportionate growth it is now experiencing.

The report concludes by recommending that the GOB include demographic factors in all its development planning. Appended is an 18-item bibliography (1975-80).

136

PN-AAK-305

MF \$1.08/PC \$9.62

Honduras: los efectos de la poblacion sobre el desarrollo social y economico (Honduras: the effects of population on social and economic development)

the Futures Group

1982, 51p. : Sp

932063700

AID/pha-C-1195

Unchecked and rapid population growth can impede general economic development and thereby reduce the individual's prospects for an improved quality of life. This report uses data from the United Nations, the World Bank, and the Pan American Health Organization to examine the relationship of demographic factors to socioeconomic development objectives in Honduras.

A first section presents basic population statistics for Honduras on rates of birth, death, and population growth; age distribution; and population growth impulse (defined as the tendency for the population to continue to increase absolutely and relatively even though fecundity is reduced or brought to the level of replacement). Population projections for the years 2000 and 2025, based on three hypothetical levels of fecundity—the current level of 7 and reduced levels of 3 and 2 offspring per female—are also presented. On the basis of these projections, distinct statistical predictions are made for the year 2000 concerning population density and, as discussed in the second section of the report, the effects of future population on specific national objectives.

Considered successively in section two are arable land per inhabitant, agrarian reform, forestry for firewood and lumber, GNP and GNP per capita, development investments, work force, urban dwellings, education, health services, and nutrition.

A third section considers effects of initiating or delaying programs of family planning in Honduras. According to the projections made, it is concluded that population control must be integrated into programs aimed toward rapid socioeconomic development if such programs are not to be severely impeded. While the programs of agrarian reform, forestry, and urbaniza-

tion would benefit only in the long run, in the short run a reduction in population growth would benefit primary education, reduce the costs of social services, and raise the levels of health and nutrition.

It is hoped that this information will stimulate further studies on a local level and will ultimately produce action to reduce the rate of population growth and thereby contribute to the success of socioeconomic development programs. Appendices include a glossary of 10 demographic terms and eight references (1977-79).

137

PN-AAJ-898

MF \$2.16/PC \$15.47

The determinants of contraceptive use, reproductive goals and birth spacing in relation to mortality, breast-feeding and previous contraceptive behavior

Janowitz, Barbara; Nichols, D.J.

International Fertility Research Program

1980, 117p. : En

932061600

AID/DSPE-G-0012

To determine the extent to which pregnancy intervals, desired fertility levels, and future contraceptive plans are determined by previous pregnancy outcomes, breastfeeding, and previous contraceptive behavior, a study was made of 20,000 women who delivered at selected maternity hospitals in Iran, Egypt, the Sudan, and Nigeria. Results of that study are presented and analyzed in this report.

Following the presentation of comparative demographic profiles of each of the four groups and a summary description of the relationship among the variables, the variables are subjected to standard linear regression analysis with pregnancy intervals, fertility intentions, and contraceptive plans as dependent variables.

The study found that pregnancy intervals can be significantly increased by prolonged breastfeeding and shortened by infant mortality insofar as the latter curtails breastfeeding. The desire for additional children, pregnancy intervals, and the use of contraceptives are also affected by the survival of the previous children. In Teheran, for example, women whose last pregnancy ended in a surviving live birth have a probability 24% less of wanting an additional child than women whose last pregnancy ended in a spontaneous abortion, nonsurviving live birth, or a stillbirth. Furthermore, the expectation that some babies will not survive encourages women to plan extra, compensating births. This is especially true of women whose last child did not survive.

The authors conclude that policies designed to reduce stillbirths, spontaneous abortions, and infant and child mortality will lower the birth rate to the extent that the relationship between child survivorship and contraceptive use is strong and the practice of breastfeeding is prevalent. Similarly, improved child survivorship will lower the probability that women will want additional children. The strategy of lowering fertility by reducing child mortality, it is noted by way of conclusion, appears especially promising in developing societies with high levels of infant and childhood mortality and political-cultural barriers to the widespread acceptance of modern contraceptive practices.

An interpretation of regression results and a comparison of selected results with those obtained using a Logit analysis are appended with 16 references (1969-79).



138

PN-AAJ-985

MF \$1.08/PC \$5.72

Contraceptive prevalence survey; model questionnaire: Iniesta de prevalencia del uso de anticonceptivos; cuestionario modelo: Etude de predominana des methodes contraceptives; questionnaire modele

Westinghouse Health Systems

1978, 44p. : En

Text in English, Spanish, and French

932000624

AID/pha-C-1194

Contraceptive Prevalence Survey (CPS) is an international research program designed to assist developing countries in carrying out periodic surveys of use and knowledge of family planning. This document presents a model questionnaire designed to elicit contraceptive information from the survey universe, i.e., all women of reproductive age (15-49) regardless of marital status. If it is culturally inappropriate to interview women who are unmarried, the target population may be restricted to women who are sexually active or legally or consensually married.

The CPS "respondent's profile" is derived from 12 questions. Age and date of birth are asked to determine whether the respondent is within the survey universe. Marital status, which serves as a surrogate measure of sexual activity, is asked at the end to avoid interviewer and respondent bias because of the sensitive nature of certain questions. Place of residence is asked to determine rural/urban or regional breakdowns of contraceptive use. Questions are asked on education, work, and ethnic background to compare contraceptive use throughout societal strata. Questions on pregnancies and live births and number of living children by sex are asked to verify parity differentials, establish a crude birth rate, and identify women who do not need contraception. Desire for additional children is determined to indicate a respondent's potential for contraceptive use and to differentiate contraceptive spacers from non-spacers. Questions on the knowledge and use of contraceptives are the most important in the survey and serve as analytical focal points for all other variables. Questions are also asked on the availability of contraceptives used (cost and transportation to and convenience of location) in order to assess program work load and measure the relative contributions of public and private contraceptive sources and to gain insights into the reasons for non-use. Finally, the reason for non-use is explicitly asked. This question also verifies whether the respondent is currently active sexually.

Sample questionnaires are included in French, Spanish, and English.

139

PN-AAK-010

MF \$1.08/PC \$9.62

Contraceptive practice

Carrasco, Enrique

International Statistical Institute. World Fertility Survey

WFS Contraceptive Studies, Cross National Summaries, no.9,

1981, 76p. : En

931057000

AID/csd-3606

As part of a series of comparative international studies, this report describes similarities and differences in levels and patterns of contraceptive use in 19 countries.

To make these comparisons, only contraceptive use, demographic, and control variables are used. Both ever-use (use at any time) and current use of contraceptives are assessed and a distinction is made between efficient (i.e., sterilization, IUD) and inefficient (i.e., rhythm, withdrawal) contraceptive methods. The demographic variables include the age of respondents and the number of living children, while control variables refer to four control groups of women: ever-married (includes "ever in union"); currently married; fecund (currently married women who are physiologically capable of having children, or who are pregnant, or who have been sterilized for contraceptive purposes); and exposed (all fecund women except those who are pregnant).

Information for the tables and graphs was collected through questionnaires designed to ascertain knowledge and ever-use of contraceptive methods in Bangladesh, Fiji, Indonesia, Jordan, Republic of Korea, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Colombia, Costa Rica, Dominican Republic, Guyana, Jamaica, Mexico, Panama, and Peru.

Generally speaking, the Asian and Pacific countries reveal lower percentages of ever-use than the Latin American and Caribbean countries, where contraceptive programs began earlier and are already highly developed in several countries. However, Asian and Pacific countries tend to be skipping the stage where inefficient methods predominate, as the ever-use of efficient methods is surprisingly higher. The pill is the most frequently reported method in all countries except Sri Lanka (rhythm), and the Philippines and Peru (rhythm and withdrawal).

Tables and charts are provided for ever-use and current-use by type of method and individual methods. Eight references (1980) are listed along with the statistical tables.

140

PN-AAK-072

MF \$1.08/PC \$3.12

World experience with use of IUD's

Speidel, J.J.; Ravenholt, R.T.

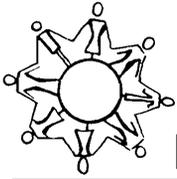
U.S. Agency for International Development. Bureau for Development Support

1979, 24p. : En

Nearly two decades of contraceptive experimentation and research reveals that successful use of intrauterine devices (IUD's) depends on a complex interplay of factors, including the IUD itself, biological variation among women, cultural differences in tolerance of its side effects, and the quality of available medical care and follow-up services. This report reviews past experience with the use of IUD's and assesses their future role in developing country family planning.

The simplicity and inexpensiveness of IUD's made them popular during the early years of developing country family planning programs. From 1962 to 1967, 60-65% of new acceptors in national programs used IUD's. Shortly afterward, however, difficulties arose in both the type of programmatic support and follow-up care offered and in the appropriateness of the device itself. Principal difficulties encountered included spontaneous expulsions, infections, ectopic pregnancies, and perforations of the uterine wall; but the greatest drawback has been the continual incidence of unacceptable pelvic pain and vaginal bleeding.

IUD usage has now declined substantially. The World Fertility Survey reveals that IUD's are currently used by only a few percent of all married women of reproductive age. For



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instance, in South Asia, less than 2 million of the 12 million IUD'S inserted since 1965 are still in use. Only in China and Bali has the IUD constituted an effective family planning device. Factors which contribute to the success of IUD's in China include strong peer group pressure and support, adequate medical backup, and the low incidence of sexually transmitted infections due to puritanical sexual mores.

Although technological improvements of the IUD are necessary, an adequate delivery and aftercare system may be more important for developing countries. Vital to a strong IUD program are publicity and psychological support for IUD use; adequate supplies for menstrual hygiene and bathing facilities; trained personnel to ensure skilled IUD insertions and after-care; sympathetic, competent, and readily available medical support; and a referral system to care for unusual but possibly life-threatening IUD side effects. Included are statistical charts and tables.

141

PN-AAK-124

MF \$3.24/PC \$32.11

A report on assistance to develop a national maternal and child health and family planning program in Rwanda

Boyton, W.H.; Downs, R.E.; Jemai, Yolande; Ross-Larson, S. E.

American Public Health Association
1981, 234p. : En
936590000
AID/DSPE-C-0053

Rwanda is plagued by overpopulation (200 people/sq. km) and by high rates of natural increase (3-3.3%) and infant mortality (137-157/1,000). While Rwanda's maternal/child

health (MCH) program is well-patronized (80% of all women receive some prenatal care), until recently the Government of Rwanda (GOR) lacked a family planning (FP) program to reduce its population growth. Realizing the need for increased FP services, the GOR created the National Office of Population (ONAPO) in 1981 and commissioned this study to assess current MCH/FP programs and to recommend ways that the GOR and international donors can expand and improve them.

The report first provides basic demographic data (health statistics, censuses, population dynamics, etc.) and suggests areas for further population research. Next, ONAPO's present policy—to encourage birth spacing to protect MCH—is discussed. The number of current contraceptive users was estimated (2,000) and used to project the demographic impact of a concerted FP program. If the number of contraceptive users increases to 70,000 by 1987, an estimated 50,000 births might be averted by that year. Rwanda's current MCH/FP programs are described including construction, training, information, education, and communication plans. On the whole, however, due perhaps to the strong religious and cultural opposition to FP revealed in an analysis of social attitudes, ONAPO's FP implementation strategy is gradual and conservative.

The report commends the GOR's efforts and recommends that A.I.D. and other international donors continue to fund FP efforts in Rwanda and ensure a steady supply of Depo Provera (the preferred contraceptive) and French-language FP literature. The GOR should establish a reliable system of collecting and analyzing data on contraceptive use, perform a national fertility study during the 1983-84 period, and officials from ONAPO and other GOR health institutions should visit FP programs in Tunisia (French), the United States, the Philippines (Catholic), and Indonesia (good coverage) to better understand what can and is being done.

A 71-item bibliography in English and French (1952-81) is appended.



SCIENCE & TECHNOLOGY

142

PN-AAJ-565
MF \$1.08/PC \$5.20

Ferrocement technology in Indonesia; interim report

Manga, J.B.
Development Technology Center
1980, 38p. : En
497026800
AID-497-79-100.33-T

Ferro-or fiber-cement (a cement reinforced with locally available materials such as wire mesh or bamboo) is especially suitable in developing countries as a substitute building material for scarce wood or imported steel. This report details the results of a ferrocement technology development project sponsored in 1977 by USAID/Indonesia.

Nine engineers from various Indonesian institutions were chosen to attend a 4-month training program at the Asian Institute of Technology in Bangkok, Thailand. Subsequently, three institutions (University of Hasanuddin, Syiah Kuala University, and the Development Technology Center, Bandung) were selected to research, design, and construct a variety of ferrocement products suitable to Indonesian conditions.

Four types of ferrocement products were completed: (1) Marine structures such as fishing boats, pontoon ferries and docks, and mooring floats. Such structures did not rot or suffer teredo (shipworm), termite, or other infestations, making them attractive replacements for wood and thus slowing Indonesia's rapid rate of deforestation. (2) Water structures, i.e., well casings, septic tanks, pipes, and channels. Such structures proved watertight and helpful in overcoming the water storage problems that exist in most areas of Indonesia. (3) Building structures including mosque domes, curved foot bridges, and walls for houses. Ferrocement was found to be easily formed and curved, to reduce the total weight of the building, and to minimize building costs by as much as 70%. (4) Fiber cement using organic fibers such as bamboo or sugar palm fiber wastes from starch flour production. Roofing panels, water pipes, and walls made from such ferrocement proved competitive with more traditional materials.

The authors conclude that ferrocement, characterized by low cost, high strength, durability, and repairability, can significantly contribute to both rural and urban development. They recommend the training of personnel at all levels, continued market studies and market development, and formation of a flexible and imaginative trouble shooting back-up system to encourage village groups to apply ferrocement technology to their local needs.

143

PN-AAJ-811
MF \$1.08/PC \$3.90

Guidelines on evaluating the fuel consumption of improved cookstoves; a manual

Thomas, Margaret; Binder, Susan; Friesen, Gerry; Evans, Ianto
Aprovecho
1981, 29p. : En

Recent concern over deforestation and firewood shortages has prompted the development of improved cookstoves to reduce fuel needs in urban and rural developing areas. Because past assessments of the fuel efficiency of such stoves have been confusing, complicated, and replete with opportunities for error, this manual details the simple, three-step process

that follows for evaluating, at the household level, the fuel efficiency of these cookstoves. (1) Talk with and observe cooks to get information about the size of household, type and location of stove used, number of pots used, type and amount of fuel used, type and amount of food cooked, etc. (2) Use one or more of four simple household measurements to statistically determine amount of fuel saved by improved stoves. The single meal measurement method compares fuel usage of a traditional versus improved stove to cook a main meal. In the cost comparison method, the fuel purchases of traditional stove users are compared to those of improved stove users for a 3-month period. Woodstack measurements determine fuel savings by weighing wood at the week's start and end, comparing traditional stove with improved stove households. The modified kaya test compares the fuel use of the two stoves by asking cooks to alternately use traditional and improved stoves every other day for two weeks. Daily measures of the fuel usage are taken. Similar measurements in Africa have shown a fuel savings of 20-50%. (3) Use isolated variable tests under controlled conditions in regional testing centers to test and evaluate fuel savings due to changes in stove design or operating conditions. The importance of choosing effective evaluators and of their need to acquaint themselves with local fuel and cooking practices is stressed.

Included are many practical tips for talking with cooks about cooking and fuel use; a list of equipment needed for taking fuel measurements; cautions to be alerted to; and the kinds of information that can and cannot be expected at each of the three steps in the process. A simple statistical analysis for comparing fuel consumption by traditional and improved stoves and a 7-item annotated bibliography, including one item in Spanish, (1980-81) are appended.

144

PN-AAJ-891

MF \$1.08/PC \$4.81

Approaches to appropriate agricultural technology in Egypt; a special case study evaluation

Pearson, R.W.
U.S. Agency for International Development. USAID/Egypt
1981, 37p. : En
263009600
NEB-0096-C-00-1063-00

Appropriate agricultural technologies (AAT) could greatly improve Egypt's agricultural production. This paper compares successful AAT projects in Turkey and Pakistan with ongoing efforts in Egypt, particularly the AID-funded Small Scale Agricultural Activities Project (SSAA), identifying points of commonality and developing a generalized approach to AAT.

Successful projects had six points in common: (1) an agricultural need was identified; (2) an AAT was developed to meet that need; (3) a prototype was developed/adapted to the technical capabilities of local manufacturers; (4) the product was field tested; (5) the prototype was modified after trials; and (6) the product was extended to manufacturers and end-users.

The main agricultural needs in Egypt were identified as: (1) mechanization with tractors, appropriate tractor attachments, and farm implements; (2) cottage and agro-industries (e.g., food processing); and (3) alternative energy technologies using solar, wind, and biogas power.

AAT can only be implemented if the Government of Egypt, Western donors, and recipient farmers have a positive attitude towards new technologies and are given adequate research



Measuring the fuel efficiency of improved cookstoves such as this one in Honduras is a challenging task which has only recently been explored.

and development (R&D) assistance, suitable manufacturing conditions, and extension links between the manufacturers and the final users. Egyptian R&D institutions and manufacturing workshops can, with additional funding, be developed through training programs, better equipment, and technical assistance. However, Egyptian extension links are almost non-existent and will require coordination between banks, the Ministry of Agriculture, donors, R&D institutes, and local areas.

The SSAA, designed to introduce AAT in Egypt, utilizes small shops and intensive on-site testing. To date, no SSAA technologies are in use in rural areas nor are training programs geared toward manufacturers and end-users. However, the SSAA, through the provision of grants and technical assistance, could be used for extension activities and to establish needed links between the development and implementation of AAT in Egypt.

145

PN-AAJ-896

MF \$1.08/PC \$6.37

Area sampling frames for agriculture in developing countries

Willett, J.W.

U.S. Department of Agriculture. Economics Research Service
1981, 49p. : En

Pressing global demands for increased agricultural productivity and rapid changes in agriculture make reliable and timely agricultural data indispensable to development planners, farmers, policy-makers, and national governments. This report summarizes the utility of area sampling frames (ASF), promoted by the Economics and Statistics Service of the U.S. Department of Agriculture, in helping 12 developing countries produce accurate agricultural data.

ASF's break down land area, with the help of aerial photographs and Landsat remote sensing images, into units suitable for sampling and data collection. They have been used since the late 1940's in the United States to estimate crop area, yields, production, prices, and other items. This experience has proven that ASF's yield high economic and social returns while maintaining low sampling errors.

ASF data can be used to increase the productivity of small-scale agriculture in developing countries and monitor desertification (e.g., in the Sahel) by determining the status of dryland ecosystems and changing areas. Projects are carried out in four phases: (1) construction of the ASF; (2) field surveys (e.g., yields or irrigation); (3) computer classification of agricultural areas using remote sensing data; and (4) agricultural crop yield models. Phase 1 has been completed in Jamaica, Costa Rica, Tunisia and the Dominican Republic, and has been initiated in Bolivia, the Philippines, Indonesia, Morocco, Sierra Leone, Liberia, Sudan, and Ecuador.



The background of ASF's in each of these countries is provided along with the major problems encountered such as organization and supervision deficiencies, lack of training in interpretation of aerial photos and Landsat imagery, outdated maps, poor weather conditions, and a lack of cooperation from host governments. In the four countries where ASF's are completed, problems with poor quality maps and photos, changes in agricultural regional boundaries, and conditioning biases from utilizing the same samples, have limited ASF's effectiveness. At the time of this report, it is uncertain whether feasibility studies for Phases 3 and 4 will be undertaken.

A total of 10 references (1971-80) are appended.

146

PN-AAJ-914

MF \$7.56/PC \$89.83

Proceedings of Sudan symposium and workshop on remote sensing

Andrawis, A.S.; Khidir, M.O.

Democratic Republic of the Sudan. National Research Council

South Dakota State University. Remote Sensing Institute.

Visiting International Scientist Program (Sponsor)

1980, : 2v. in 1, En

931116600

AID/ta-C-1468

Remote sensing (RS), the use of satellites to record topographical characteristics, can help developing nations better manage their land and natural resources. This report presents the proceedings of a seminar on RS partially sponsored by A.I.D. and held in Sudan from October 1-11, 1979.

The papers delivered at the seminar concerned: the role of the National Council for Research in adopting new technologies; the history of RS; Landsat's view of the Sudan; the use of radar for vegetation analysis; maps as a fair measure of a country's topographical knowledge; RS activities and future plans in Sudan; the Landsat system and other resources satellites; vegetation mapping with emphasis on forestry in southern Sudan; interpretation models for using Landsat data; radar uses for natural resources inventories in arid zones; and evaluation of Landsat data for disaster assessment and planning with emphasis on the 1978 Sudan flood; land use mapping in central Sudan; the use of Landsat imagery for determining soil potential using the Jonglei Project as an example; how to apply Landsat imagery for geologic mapping, mineral exploitation, and hydrogeology; image processing and information systems; RS and cartography in the Sudan; the use of Skylab S-190B photography for small-scale mapping; hydrogeological interpretation using Landsat data in difficult areas; geological application of Landsat data to central Sudan; planning the use of RS for resource assessment and monitoring; general principles of application of RS in urban and regional planning; a Khartoum-area example of urban and regional planning using RS techniques; RS for sensing and monitoring soil resources and areas affected by desertification in central Sudan; application of Landsat for determination of land resources and desertification monitoring; mapping and locating Aeolian features (sand dunes) and areas of high wind potential using Landsat data; a hydrology and desertification study of central Sudan; and an integrated geology study of central Sudan.

A list of references is appended to each paper. A list of seminar participants is provided.

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PN-AAJ-915

MF \$8.64/PC \$79.95

Compte-rendus du seminaire de teledetection; Senegal

van Sleen, L.A.

South Dakota State University. Remote Sensing Institute.

Visiting International Scientist Program

1980, : 2 v. in 1, En

Text in French and English

931116600

AID/ta-C-1468

Remote sensing (RS), the use of satellites to record topographical characteristics, can be of great help to developing nations by providing them with vital information on land and natural resources management. This two-volume document presents the proceedings of a seminar on RS and natural resources partially sponsored by A.I.D. and held in Dakar, Senegal from March 31 to April 10, 1980.

During the five sessions the following topics were treated: the physics of RS; the capabilities of the Landsat satellite; image processing and information systems; establishing a topographical data bank on the Lower Casamance region of Senegal; creating a mosaic of Senegal at a scale of 1:500,000; image interpretation models of Landsat data; a physiographical analysis of Senegal's soil using RS; the use of radar in vegetation analysis and natural resources inventories in arid zones; the FRACARTE system and physiographical cartography of western Senegal; physiographical analysis of Lower Casamance using Landsat data; Senegal seen from Landsat; planning the use of RS for resource assessment and monitoring; a comparison of costs and precision between the Landsat and Photo-Aerienne images of a region of Mali; the contribution of Landsat to the study of soils in Lower Casamance; using 1973 RS data to define vegetation groupings in Lower Casamance; and a study and mapping of desertification in northern Senegal. Two papers not delivered at the seminar but included here concern the causes of desertification in north-central Senegal and application of Landsat data to forest inventory operations.

Seminar recommendations include: creating a Senegalese RS cadre and infrastructure to carry out RS analysis; integrating RS analysis functions at the national level; holding periodic seminar and training programs on RS interpretation; building a national Landsat photography and recordings library; and making the Study Group on the Development of RS a national commission.

Bibliographies or lists of references are appended to each section. A list of seminar participants is also included.

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PN-AAJ-984

MF \$1.08/PC \$7.54

Increasing agricultural production through more effective use of technology: recommendations for a strengthened agricultural extension program in Egypt

Firebaugh, F.M.; Kiehl, E.R.; Lowdermilk, M. K.; McDermott,

Robins, J. S.; York, E. T.

U.S. Agency for International Development. USAID/Egypt

1981, : En

Current technology could significantly increase Egypt's agricultural productivity and provide more food for the country's



SCIENCE & TECHNOLOGY

population, which will double in the next 20 years. Against a background description of Egypt's agricultural needs and potential, this report presents the findings and recommendations of a U.S. team which reviewed Egypt's agricultural research and extension (ARE) programs.

The team found that: (1) Despite the rich land, water and climate of Egypt's Nile Valley and Delta (which accounts for only 3.5% of the country), arable land is limited. (2) Because land reclamation is costly and has a limited net impact on agricultural productivity, increasing agricultural productivity depends on increased Government of Egypt (GOE) investment in improved technology. (3) Weak and uncoordinated ARE programs and obsolete GOE policies such as compulsory plantings and fixed prices for commodities delivered to the GOP are the main constraints to higher agricultural productivity. (4) A.I.D.'s agricultural productivity projects are not adequately integrated into Egyptian ARE institutions and 13 university faculties of agriculture and numerous agricultural professionals are not effectively involved in national ARE activities. (5) Productivity of rural Egyptians, especially women, will increase along with improved technology.

Based on these conclusions, the team recommends that the GOE: (1) create a single ARE unit to provide a link between the research and extension functions, along with a Technical Support Division of Extension composed of trained specialists working closely with their research counterparts; (2) integrate agricultural colleges into national ARE activities; (3) provide continuing education and incentive programs for extensionists; (4) establish clear and direct lines of authority and communication between the national- and village-level extension services; (5) ensure that extensionists pay special attention to the needs of rural families and women; and (6) update its agricultural policies and agencies. The team also recommended that A.I.D. integrate its current projects into recommended ARE program design and that a joint Egyptian/U.S. team annually review the progress of the program.

Appended are two annexes and a bibliography (1977-81).

149

PN-AAK-048

MF \$1.08/PC \$8.58

Analysis and interpretation of SEASAT synthetic aperture radar data for portions of Costa Rica, Haiti, and Honduras

Ott, J.S.; Roller, N.E.; Wagner, T. W.

Environmental Research Institute of Michigan

1981, 66p. : En

931116600

AID/DSAN-C-0147

Space-borne remote sensing is a relatively novel technique for mapping, monitoring, and inventorying forestry, geological, soil, and water resources. This report describes a 1-1/2 year project to study the nature of Seasat Synthetic Aperture Radar (SAR) remote sensing data for portions of Costa Rica, Haiti, and Honduras and to assess SAR-type data utility for supplying resource information to developing countries.

Unlike Landsat remote sensing, SAR, a high-resolution imaging system, enabled Seasat to "see" through unfavorable weather conditions, including clouds, haze, and dust, often present during tropical growing periods.

Data for agricultural Western Costa Rica revealed significant differences in tone and texture relating to vegetation height and density. Bare and newly planted fields (rice, cotton, and sugar cane in early growth) were differentiated from fields

with moderate crop growth (pasture) and these in turn were differentiated from relatively tall or rough canopied crops (sorghum, forests, and ripened cane). In Haiti, drainage patterns and geologic faults were apparent and could possibly be mapped from the SAR data. Vegetation information was interpretable only in a few level coastal and plain areas. Data for Eastern Honduras revealed differences in marsh vegetation and soil moisture content as well as varied vegetation patterns determined by topography and surface hydrology.

Analysis of the utility of the black and white SAR imagery revealed that Landsat color imagery is a better source for identifying vegetation cover, particularly in high relief areas. Conversely, Seasat SAR imagery enhances certain topographic features and is better suited for wetlands, soil moisture patterns, and physiographic features which make use of SAR's all-weather capacities. Ideally, a combination of both data sources, as verified by onsite surveys, would be optimal for geological and hydrological studies.

The authors recommend that the effects of SAR system parameters on radar response (e.g., the wavelength and polarization of the radar and the incident angle of the radar beam) be studied further to determine the most appropriate satellite radar system for each of A.I.D.'s assistance programs. Appended is a 34-item bibliography (1960-80).

150

PN-AAK-051

MF \$2.16/PC \$21.19

Food, fuel, and fertilizer from organic wastes

National Research Council. Commission on International

Relations. Board on Science and Technology for

International Development

1981, 163p. : En

936553800; 931122300

DAN-5538-G-00-1023-00

In an age of resource scarcity, waste materials from agriculture, agro-industrial processing, animals, and humans can help fulfill the world's requirements for food, fuel, and fertilizer. This study, based on presentations and discussion at a panel meeting of the National Research Council's Advisory Committee on Technology Innovation held August 6-8, 1979, in Airlie, Virginia, presents six alternatives for waste utilization.

First, the use of animal and other farm wastes as feed can produce aquaculture yields dramatically higher than those achieved with current methods due to the use of polycultures and the nutrients generated by manure in the pond. Next, significant human food production from agricultural wastes include molds, fungi, yeasts, and bacteria. Because of health hazards, however, human food production from waste is less preferable on a large scale than the third type of waste utilization—animal feed. The nutritional value of farm wastes (particularly straw) for animal feed is high and can be further supplemented, e.g., by treating straw with alkali. Fourth, many fuels may be obtained from human, animal, and agriculture wastes such as biogas (methane), ethanol (used in mixtures with gasoline), and pyrolysis, (heating of wastes in the absence of oxygen to produce solid, liquid, and gas fuels). Fifth, human and animal wastes, compost, and sewage have widespread use as fertilizers and soil conditioners. The water hyacinth, a prolific floating tropical plant, can be used in waste water purification. Sixth, for optimal use of resources, the use of integrated systems (where the wastes of one process serve as the raw material of another) are encouraged. Limitations of each of these waste-use technologies, suggestions for future



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research, and lists of references are provided at the end of each of the six sections.

The study concludes that the success of waste reuse depends on well-developed technology as well as on non-

technical considerations such as public health; the impact of a given technology on income distribution; the presence of institutional and technical resources (training, marketing, management, financing, etc.); and social acceptability of waste-use technologies.

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Realization of women's dual role as worker and mother and a heightened awareness in both developed and developing countries of women as worthy, integral members of society must occur before measurable changes in women's status are seen.

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