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INTRODUCTORY NOTES

A.I.D. Research and Development Abstracts (ARDA) announces R&D titles produced under the sponsorship of the Agency for International Development. The goal of ARDA is to transfer developmental and technical information to LDC institutions, to USAID Missions, to A.I.D. staff, and to other interested parties. It guides its users to sources where copies of documents may be obtained.

The following documents are of special interest in this issue:

- (1) papers from a conference on valuing the productivity of agricultural research—see items 293-298.
- (2) a survey, recently published, on the status of rural women in Thailand—see item 311.
- (3) a study done by Harvard on global malnutrition and cereal fortification—see items 341-345.
- (4) a Harvard study on rural public works projects—see item 309.

This issue also highlights the following subject areas:

- (1) The use of educational and communications technology in development; see item nos. 362, 363, 396-419, and 428;
- (2) Rural development and assistance to the rural poor—see items 304, 305, 307-311, 365, 391, 392, 394, 400, 403, 404, 405, 426, 427, and 445;
- (3) Human nutrition and food processing—see items 338-366, and 374;
- (4) The use of local woods and the development of wood products industries—see items 330-334, 372, and 373.

ARDA is also continuing its coverage of items on:

- Women in Development—see items 304, 310, 311, 368, 346-349, 353, 354, 365, and 356-358;
- The SAHEL region—see items 421, 422, and 433.

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January 1978

TABLE OF CONTENTS

	Item Numbers	Page
ABSTRACTS OF R&D PUBLICATIONS BY SUBJECT FIELDS		
AGRICULTURE AND NUTRITION		
AGRICULTURAL RESEARCH	(293) - (299)	1
AGRICULTURAL ECONOMICS	(300) - (304)	2
AGRICULTURAL DEVELOPMENT	(305) - (310)	3
RURAL SOCIOLOGY	(311)	5
AGRICULTURAL DISTRIBUTION AND MARKETING	(312) - (313)	5
PLANT PRODUCTION	(314) - (319)	6
LIVESTOCK	(320) - (321)	7
SOIL RESOURCES	(322) - (324)	8
PLANT PROTECTION	(325) - (328)	8
WOOD TECHNOLOGY AND INDUSTRIES	(329) - (334)	9
FISHERIES	(335)	11
WATER RESOURCES	(336) - (337)	11
FOOD PROCESSING	(338) - (340)	12
HUMAN NUTRITION	(341) - (366)	12
DEVELOPMENT ASSISTANCE	(367) - (368)	19
ECONOMICS		
GENERAL	(369) - (373)	19
SMALL-SCALE INDUSTRIES	(374) - (376)	20
EDUCATION		
GENERAL	(377) - (388)	21
NON-FORMAL EDUCATION	(389) - (395)	24
EDUCATIONAL TECHNOLOGY	(396) - (419)	26
HEALTH		
GENERAL	(420) - (423)	31
DELIVERY SYSTEMS	(424) - (426)	32
HEALTH EDUCATION	(427) - (430)	33
SCIENCE AND TECHNOLOGY		
REMOTE SENSING	(431) - (432)	34
HOUSING TECHNOLOGY	(433) - (434)	34
SOCIAL SCIENCE	(435) - (436)	35
URBAN DEVELOPMENT AND HOUSING		
URBAN DEVELOPMENT	(437) - (442)	35
HOUSING	(443) - (444)	37
BIBLIOGRAPHIES		
AGRICULTURE	(445) - (450)	37
AUTHOR INDEX		40
INDEX OF ISSUING OFFICES		42

SAMPLE DOCUMENT CITATION AND ABSTRACT

Item Number & Title	[(171) WHEAT X RYE EQUALS TRITICALE Wolff, Tony]	Author(s)
Document Date & Number of Pages	[1976, 15p. CIMMYT (AID/ta-G-1083 GTS)]	Issuing Office & Contract/Grant Number or Symbol
Series Note	[(In CIMMYT today, no. 5)	
Abstract	<p>Triticale, a new crop bred at CIMMYT, is a cross between wheat and rye. It is the first successful "man-made" cereal grain. It is more than a biological curiosity. For the tropics and subtropics, it offers promise of yields and other characteristics equal to those of wheat, combined with tolerance for drought and poor soil and the resistance to disease typical of rye. The success of triticale encourages the hope that other such intergeneric "wide crosses" will soon follow. Triticale has demonstrated an adaptation to acidic, low pH soils in several areas of the world. Such conditions exist in Colombia, Ethiopia, Northern India, and Brazil. In each of these countries triticales have shown yield performance superior to wheat. The resistance of triticale to bunts and loose smut at higher elevations is an advantage for the crop. Its greater resistance to <i>Septoria tritici</i> is an added advantage in areas where this disease is prevalent—Brazil, Argentina, Ethiopia, and the Mediterranean region. In Kenya and some other locations, triticale has outyielded wheat under drought conditions. Experts expect that in fifteen years triticale will be competing seriously with the bread wheats as one of the world's most important food crops.</p>	
Publication Number	[PN-AAD-154	Paper copy \$2.00 Microfiche \$1.00] — Prices

(Related titles in a series are frequently listed below the citation.)

When completing order forms at the rear of this issue, be certain to use the Publication Number.

AGRICULTURE AND NUTRITION

AGRICULTURAL RESEARCH

(293) VALUING THE PRODUCTIVITY OF AGRICULTURAL RESEARCH, PROBLEMS AND ISSUES; AND THE FUTURE OF THE INTERNATIONAL RESEARCH SYSTEM

Arndt, T. M.; Ruttan, V. W.; Mosher, A. T.; Schultz, T. W.; Crawford, J. G.; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va., 1975 1977, 65p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 3-25 and 567-598)

These sections comprise the introduction and the final collection of papers from the Airlie House conference of 1975. The introduction (by Thomas M. Arndt and Vernon W. Ruttan) highlights the main issues of the conference which examined the returns to investment in national and international agricultural research systems and which explored the social and economic factors for the organization and management of such research systems. The final section of papers from the conference is devoted to a discussion of the research strategy and management issues that will affect the future of the international agricultural research system and the productivity of national research systems. The first paper (by A. T. Mosher) discusses the unresolved issues in the evaluation of the international system. A second essay (by Theodore S. Schultz) focuses on the role of economic policy in influencing the prospects for gains from agricultural research. In the final paper (by J. G. Crawford) the policies and problems facing the Consultative Group on International Agricultural Research and its Technical Advisory Committee in their efforts to strengthen national and international research are reviewed.

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Paper copy \$6.15
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For a summary paper on this conference, see ARDA 5:2, no. 144.

PN-AAD-091 (19p.)

Paper copy \$2.00
Microfiche \$1.00

(294) PRODUCTIVITY OF NATIONAL RESEARCH SYSTEMS

Hayami, Yujiro; Peterson, Willis; Hartford, Reed; Kahlon, A.S.; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va., 1975 1977, 149p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 29-167)

This first section of papers from the Airlie House conference focuses on the productivity of national research systems. In this section there are two papers on the organization and productivity of research systems in developed countries: the first (by Yujiro Hayami and Masakatsu Akino) describes the national-prefectural system in Japan; the second (by Willis L. Peterson and Joseph C. Fitzharris) discusses the federal-state system in the U.S. Two papers cover returns to investment in agricultural research in developing countries, one drawing upon the experience in Colombia (by Reed Hartford, Jorge Ardila, Andres Rocha, and Carl Trujillo) and one focusing on India (by A. S. Kahlon, P. M. Saxena, H. K. Bal, and Dayanath Jha). The final paper in this section (by Reed Hartford and Andrew Schmitz)

reviews some of the theoretical foundations of, and empirical considerations involved in, the evaluation of returns to research.
PN-AAE-269

Paper copy \$13.15
Microfiche \$2.00

(295) PRODUCTIVITY OF INTERNATIONAL RESEARCH SYSTEMS

Dalrymple, D. G.; Evenson, R. E.; Kislev, Yoav; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va. 1975 1977, 117p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 171-277)

The second section of papers from the Airlie House conference of 1975 includes three papers on the productivity of international agricultural research systems. The first paper (by Dana G. Dalrymple) documents the impact of the CIMMYT and IRRI varietal developmental programs on wheat and rice production in Asia. A second paper (by Robert E. Evenson) reviews the history of cycles in research productivity and in international diffusion patterns for three commodities: sugarcane, wheat, and rice. A third paper (by Robert E. Evenson) presents measures of the rates of return to the resources invested in research at IRRI and CIMMYT. The fourth paper (by Yoav Kislev) develops a theoretical model of applied research consistent with the historical experience reviewed in the first two sections of papers from the conference.

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(296) ORGANIZATION AND DEVELOPMENT OF THE INTERNATIONAL INSTITUTE SYSTEM

Crawford, J. G.; Brady, N. C.; Hanson, Haldore; Wortman, Sterling; Swanson, B. E.; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va., 1975 1977, 93p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 281-363)

The third section of papers from the Airlie House conference of 1975 is devoted to the international agricultural research institute system. The first paper (by J. G. Crawford) traces the development of a system for organizing, funding, and managing the new institutes, spearheaded by the Ford and Rockefeller foundations and now guided by the Consultative Group on International Agricultural Research (CGIAR). The programs that have been developed to achieve closer articulation of the research programs of the international and national systems are outlined by the director of IRRI (Nyle C. Brady) and the director of CIMMYT (Haldore Hanson). The problem of establishing effective working relationships between the international and national agricultural research systems is reviewed (by Sterling Wortman). The final paper (by Burton E. Swanson) presents a comparison of the impact of the IRRI and CIMMYT training programs on the career patterns and effectiveness of young scientists who have studied at these two programs.

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AGRICULTURE AND NUTRITION

(297) ORGANIZATION AND MANAGEMENT OF AGRICULTURAL RESEARCH SYSTEMS

Moseman, A. H.; Ulbricht, T. L. V.; Pastore, Jose; Alves, E. R. A.; Sehgal, S. M.; Pinstруп-Andersen, Per; Franklin, David; Shumway, C. R.; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va., 1975 1977, 101p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 367-457)

The fourth section of the Airlie House conference of 1975 covers issues bearing directly on the organization and management of agricultural research systems. The first paper (by Albert H. Moseman) outlines the evolution of coordinated national research projects for improving food crop production. Two papers focus on the problem of reorganizing and reforming national research systems: in the United Kingdom (by Tilo L. V. Ulbricht) and in Brazil (by Jose Pastore and Eliseu R. A. Alves). Next, the contribution of private sector international agricultural research is described (by S. M. Sehgal), based on the experience of Pioneer Hi-Bred International. A systems approach to research resource allocation is outlined and evaluated (by Per Pinstруп-Anderson and David Franklin). The final chapter in this section (by C. Richard Shumway) presents a review and evaluation of the literature on formal modes and methods for allocating resources in research.

PN-AAE-272

Paper copy \$9.15
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(298) ECONOMIC AND SOCIAL FACTORS IN RESEARCH RESOURCE ALLOCATIONS

Abel, M. E.; Welsch, D. E.; Mellor, J. W.; Ramalho de Castro, J. P.; Schuh, G. E.; Binswanger, H.P.; deJanvry, Alain; Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House Va., 1975 1977, 113p.

ADC (CSD-2813 GTS)

(In Resource allocation and productivity in national and int. agr. research, ed. by T. M. Arndt, D. G. Dalrymple, and V. W. Ruttan, p. 461-563)

The fifth section of the collection of papers from the Airlie House conference of 1975 examines the role of economic and social factors in allocating resources for agricultural research. The first paper (by Martin E. Abel and Delane E. Welsch) outlines a theoretical model for exploring the relative effects of environmental constraints and commodity mix on research resource allocation. The second paper (by John W. Mellor) is devoted to an empirical evaluation of the effects of efforts to relate research resource allocation to alternative goals such as labor absorption. In a third paper (by J. P. Ramalho de Castro and G. Edward Schuh) the use of an economic model to establish research priorities, based on data from Brazil, is illustrated. The role of research endowments and relative prices in inducing the choice of alternative paths of technical change—that is, labor saving versus land saving—is documented (by Hans P. Binswanger). The final paper (by Alain de Janvry) presents a theoretical model of dialectical interaction between technical and institutional change in agriculture which suggests important directions for future research.

PN-AAE-273

Paper copy \$10.15
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(299) MEASURING THE GREEN REVOLUTION; THE IMPACT OF RESEARCH ON WHEAT AND RICE PRODUCTION

Dalrymple, D. G.
1975, 43p.

USDA/ERS (RSSA USDA-3-74 GTS)

(In Foreign agr. economic rpt. no. 106)

Reviews the main considerations in evaluating the effects of research programs on crop production in developing nations. Internationally sponsored agricultural research for developing nations has grown to include six active international institutes; three more are under development, as are two related programs. This report focuses on high yielding varieties of wheat and rice and outlines the direct and indirect effects on output, cites the problems of linking research with changes in production, and examines several major approaches to measurement. Changes in area and yield in countries adopting the high-yielding varieties are explored. Two complex tools for assessing the effect on production—production function and index number analysis—are outlined; both these types of analysis can be improved by refining techniques and improving data. The report concludes by reviewing the need for more research and additional funding.

PN-AAD-451

Paper copy \$3.60
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AGRICULTURAL ECONOMICS

(300) SOUTHEAST ASIAN CORN COMMODITY SYSTEMS

Drilon, J. D.; SEARCA; Harvard. Univ. Business School
1976, 330p.

Harvard (CSD-3153 GTS)

(SEARCA-Harvard project 928-B)

The role of corn in the economy of the Philippines was assessed as part of the Harvard-SEARCA project on Southeast Asian corn commodity systems. Corn was first introduced in the Philippines early in this century. Though it is less costly than rice, only about 20 percent of Filipinos eat corn instead of rice. Rice has higher protein value and greater digestibility, and most Filipinos prefer its taste. In mid-1972, when floods in Luzon created a rice shortage, corn from Mindanao was shipped to other parts of the country to ease the rice shortage. About 80 percent of the corn production of two million tons per year is used for human food and bakery products; the rest is used as feedgrain for poultry and livestock. Stalk fibers are made into paper and yarn, inner husks are made into cigarette paper, and the cob is a source of furfural, a material used in making solvents, explosives, and plastics. The 14 processing industries now using corn by-products to make drugs, paper, textiles, adhesives, salad oils, beer, leather preservatives, and soft drinks represent an area for future development. Thus, the present corn system appears to offer much potential. White corn acts as a buffer staple. Yellow corn is a critical raw material for livestock feeds. Corn by-products offer a wide range of industrial applications.

PN-AAD-677

Paper copy \$28.15
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(301) ECONOMIC CONSTRAINTS ON AGRICULTURAL TECHNOLOGY ADOPTION IN DEVELOPING NATIONS

Schutjer, W. A.; Van der Veen, M. G.
1977, 59p.

AID/TA/AGR/ESP

(In AID/TA/AGR/ESP. Occasional paper no. 5)

This review of studies about economic constraints on the adoption of agricultural technology identifies important knowledge

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AGRICULTURE AND NUTRITION

gaps regarding that process. It outlines the implications of the review for technology-based agriculture and rural development programs. This review focuses on what is now known about economic constraints to the adoption and effective use of new and improved technology by farmers in developing nations. A number of general guidelines for both agricultural development policy and for research required in the formulation of effective technology-based agricultural and rural development policies and programs are identified. The paper reviews the characteristics of the principal sets of agricultural technology and reports findings on the economic constraints to technology adoption. It also presents suggestions for policy guidelines and research needs. The initial sections are followed by a bibliography of cited material and papers which would be useful in understanding the current state of knowledge.

PN-AAD-805

Paper copy \$5.65
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(302) TECHNICAL CHANGE, LABOR USE, AND SMALL FARMER DEVELOPMENT: EVIDENCE FROM SIERRA LEONE

Spencer, D. S. C.; Byerlee, Derek
1976, 24p.

Mich. State (CSD-3625 Res.)

(In Working paper no. 15)

Because rice farming in Sierra Leone is limited by a shortage of labor during the two peak periods of planting and harvesting, research was conducted to find the technological inputs which would help to reduce these labor bottlenecks. The family labor inputs in two rice-farming areas—Boliland and the Moa Basin—were assessed against differences in chemical and mechanical inputs (seeds, fertilizers, tractors). Findings showed that mechanical inputs can overcome peak-season labor constraints where there is a high ratio of land to labor. The use of tractors also increases the acreage cultivated. However, because of the costs of using tractors, the economic returns are low. The use of seeds and fertilizers increases the productivity of lands cultivated, but, because of a large increase in labor requirements, the returns to labor are below that for traditional swamp rice cultivation. Under present costs and factor endowments, both types of technological inputs have low economic returns in lowland farming. Higher returns to peak-season labor can be obtained by providing improved seed and fertilizer for growing upland rice.

PN-AAD-483

Paper copy \$2.00
Microfiche \$1.00

(303) COOPERATIVE AND COMMUNE: GROUP FARMING IN THE ECONOMIC DEVELOPMENT OF AGRICULTURE

Dorner, Peter, ed.; Conf. on Group Farming, Univ. of Wis, 1975; Wis. Univ. Land Tenure Center; Agr. Development Council, N. Y.
1977, 386p.

ADC (CSD-2813 GTS)

In many developing countries, governments have an interest in group farming as a means of reorganizing their agriculture to deal with economic and social issues. Group farming includes agricultural production cooperatives with various degrees and levels of integration as well as other forms of group or collective farming. This volume is based on papers presented at the Group Farming Conference held at Madison, Wisconsin, in June, 1975. The sixteen authors were selected on the basis of their research on group farming in specific countries or their personal and professional work in setting up group farming systems. The authors are from the U.S., France, Israel, Sri Lanka, Switzerland, Poland, Peru, Japan, Ghana, Australia, Germany, and Singapore. The

book is organized into six parts. Part 1 contains Boguslaw Galeski's paper on classification and models of collective farming. Part 2 "Communal Forms of Group Farming", contains papers on the Israeli kibbutz and the Hutterian colony. Part 3, "National Collective Systems", includes a paper on the Soviet Kolkhoz and two papers on the agriculture of the People's Republic of China. Part 4, "Mixed Collective/Individual Farming Systems", presents papers on group farming in Yugoslavia, Chile, Peru, Tanzania, Dahomey, and Sri Lanka. Part 5, "Group Farming in Industrial Market Economies", presents papers on group farming in Japan and France. Part 6, "In Retrospect", includes a paper on the applicability of the Soviet model of collectivization and a paper on the issues in introducing group farming in less developed countries.

PN-AAE-036

Paper copy \$32.80
Microfiche \$ 4.00

(304) A STRATEGY PAPER FOR INTEGRATING LDC RURAL WOMEN INTO THEIR NATIONAL ECONOMIES

Van Haeften, R. K.; Caton, Douglas
1974, 38p.

AID/TA/AGR

LDC rural women are a large part of the labor force in developing countries, yet they have low status, poor physical well-being, and unequal participation in the economy. This paper discusses these problems and sets forth three basic strategies for dealing with them: to increase the social services directed to rural women, to increase the productivity of the women's labor, and to increase the productivity of the entire rural community. Theoretical models are used to illustrate the various techniques which might be employed. These strategies are evaluated from an economic standpoint with emphasis on the fact that economic growth is only a means to an end—improving human welfare. A.I.D. strategies in dealing with these problems are examined and evaluated. Alternatives which would deal with the underlying causes, and not only the symptoms, of these problems, are suggested. These are (1) to convert existing or proposed rural development projects, (2) to select a limited number of high priority impact projects dealing specifically with the problems of rural women, and (3) to help countries design and implement comprehensive rural development programs which concentrate on the rural disadvantaged and their productive employment. Alternatives two and three are recommended.

PN-AAD-801

Paper copy \$3.15
Microfiche \$1.00

AGRICULTURAL DEVELOPMENT

(305) RESEARCH AND INFORMATION REQUIRED TO SUPPORT THE EFFORT TO REACH THE RURAL POOR

Green, J. W.
1975, 59p.

AID/TA/RD

Presents inputs and recommendations from members of the Working Group on Rural Poor (WGRP) on the kinds of knowledge and types of research needed to program resources to improve the standard of living of the rural poor in LDCs. The data are arranged in three different parts: A.I.D. policies and procedures, methods of research, and the content or subject matter of research. Topics found in each of these broad areas comprise the subjects of the twelve sections of the paper. The subjects covered are: operational definitions of the rural poor,

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AGRICULTURE AND NUTRITION

A.I.D. policy issues, indicators of success, programming assistance, compilations of empirical research, case studies, anthropological analyses, baseline studies, experimental design, related policies and politics, technology, and non-categorized research and information. Research is not differentiated from systematic data gathering, although it is sometimes evident that the recommendation falls completely into one category. The recommendations may call for a full-scale scientific research effort or for a local data-gathering exercise, depending upon the purpose to be served.

PN-AAD-817

Papercopy \$5.65
Microfiche \$1.00

(306) MANAGING PLANNED AGRICULTURAL DEVELOPMENT, A REFERENCE BOOK

Waterston, Albert; Governmental Affairs Institute, Washington, D. C.
1976, 624p.

GAI (CSD-3630 GTS)

(Appen., 116p.: PN-AAD-679)

A basic problem with planned agricultural development in LDCs is that central planners specify what must be done to achieve targets without specifying how, by whom, and when. A great gap exists between government officials and tradition-bound farmers. The objective of this reference work is to help bridge the gap by providing information for improving the capabilities of planners on the regional and local levels. It concentrates on materials that can improve decision-making in the management of agricultural plans and programs. The materials are derived from an analytic review of more than 1,700 reports and articles describing how agricultural projects were successfully implemented. Sections of the book deal with the following topics: the link between agricultural and overall planning; types of agricultural planning; preparing an agricultural plan; objectives for agricultural development; the stocktaking and diagnostic survey; setting targets and allocating resources; selecting agricultural development strategies; policy and policy instruments; financing agricultural plans; design and evaluation of projects; organization for planned development; extension and research; education and training; consultancy services; and monitoring, reporting, and control.

PN-AAD-678

Paper copy \$53.30
Microfiche \$ 7.00

PN-AAD-679 (Appendix, 116p.)

Paper copy \$10.40
Microfiche \$ 2.00

(307) PROJECT MANAGEMENT FOR RURAL EQUALITY; ORGANIZATION DESIGN AND INFORMATION MANAGEMENT FOR BENEFIT DISTRIBUTION IN LESS DEVELOPED COUNTRIES, V. 1: RESEARCH SUMMARY AND ACTION GUIDELINES

Honadle, George; Ingle, M. D.
1976, 48p.

Honadle/Ingle (AID/ta-C-1255 Res.)

(Vol. 2: Theoretical, empirical, and case studies, 306p.: PN-AAD-821)

This study examines the potential role of organization design in rural development administration. It can assist development managers to identify project-related distributive impacts and design project organizations which promote a more favorable benefit distribution. It should assist in project management for rural equality. It contains both a theoretical focus for academics and a practical focus for project managers, and the focus is on information processing. The goal is to find if organizational alternatives influence benefit distribution and if organization de-

sign can be used to affect that distribution. The empirical study of fifty subprojects in Africa and Latin America shows that an information-sharing perspective can be applied to rural development projects; that information sharing among subprojects is associated with project related benefit distribution patterns; and that the organizational dimension of rural development projects should receive priority attention. Guidelines are given to improve project organization design. The study also examines the definition and measurement of benefit distribution, the development and use of heuristic design techniques, and the design of project management information systems to monitor distributive impact. If an effort is to be made to reach the rural poor, the distribution of research and development funds must reflect that intention.

PN-AAD-822

Papercopy \$4.75
Microfiche \$1.00

(308) PROJECT MANAGEMENT FOR RURAL EQUALITY; ORGANIZATION DESIGN AND INFORMATION MANAGEMENT FOR BENEFIT DISTRIBUTION IN LESS DEVELOPED COUNTRIES, V. 2: THEORETICAL, EMPIRICAL, AND CASE STUDIES

Honadle, George; Ingle, M. D.
1976, 306p.

Honadle/Ingle (AID/ta-C-1255 Res.)

(Vol. 1: Research summary and action guidelines, 48p.: PN-AAD-822)

This report discusses the role of project organization in distribution, and it develops project design guidelines. It addresses the need for a theory of organization design which gives meaning to the data available and allows the development of less crude analytical techniques. These techniques can be used by project managers to design or select organizational arrangements which help to achieve the distributive goal of rural development projects. This volume contains eight annexes detailing the theoretical, empirical and case studies. They describe organization and distribution, information-processing indicators, distribution indicators, the empirical study, information management to benefit the rural poor, and guideline development. The empirical study explored the relationship between organization arrangements within development projects and distributive consequences of rural development projects in Africa and Latin America. The interrelated elements include: information independence, position homogeneity, information channels, and geographic distance. Subproject size was not consistently associated with the other internal information sharing aspects. Finally, a design-oriented case study of Bong County, Liberia, provides a preliminary test of the utility of the framework during project appraisal and design.

PN-AAD-821

Paper copy \$26.15
Microfiche \$ 4.00

(309) CREATING RURAL EMPLOYMENT, A MANUAL FOR ORGANIZING RURAL WORKS PROJECTS

Thomas, J. W.; Hook, R. M.
1977, 150p.

Harvard (AID/otr-C-1417 Res.)

This manual for policy makers and program administrators organizes the lessons of international experience with rural works programs so that they can be applied to the policy making and implementation process of specific countries. It covers the potentials and limitations of such programs, provides guidelines for deciding the effectiveness of a program in a particular area, and considers the major issues surrounding these programs. It also suggests organizational arrangements that will enhance the chances of success for such programs, and it provides criteria for

AGRICULTURE AND NUTRITION

judging their performance. There are two major sections. The first deals with planning rural works programs and the second with the implementation of programs. The research was based on an analysis of 24 existing programs, and this report summarizes that experience in ways which apply to new and existing programs. This report holds that rural works programs are useful instruments of development policy and should be considered by any country concerned about rural unemployment and poverty.

PN-AAD-892

Paper copy \$13.20
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(310) ECONOMIC RESEARCH ON WOMEN IN RURAL DEVELOPMENT IN NORTHERN NIGERIA

Simmons, E. B.
1976, 37p.

OLC (AID/afr-G36 GTS)

(IN OLC paper no. 10)

This three year study among the women of four villages of Zaria, Nigeria, develops a methodology for micro-research on how rural women participate in and benefit from the development process. It also shows how the results of such research may affect the development policies on the roles and activities of women. There is a growing interest in LDCs in the economic roles of women and how these roles affect the development policies in the country. Planners emphasize women as beneficiaries rather than participants in developing schemes. There are many impediments to a greater understanding of women's roles in economic development. The existing surveys are not adequate to show the relative importance of women in agricultural decision making. Self-employed persons of either sex are difficult to deal with in planning exercises; their wide variations in returns, skill levels, and working hours do not lend themselves to generalizations about value added or full employment. There is also a lack of prior experience and literature in this field. This project involved several cycles of interviews, three sets of questionnaires, participant observation, and longer, unstructured interviews with some women. Only at this level can differences critical to the participation of women in development be distinguished.

PN-AAD-705

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RURAL SOCIOLOGY

(311) THE STATUS OF THAI WOMEN IN TWO RURAL AREAS, SURVEY REPORT

Thailand. National Council of Women of Thailand; Thammasat Univ. Faculty of Social Administration
1977, 166p.

AID/ASIA/USAID/Thailand

Presents the results of a survey carried out in 1977 on the status of women in twenty rural villages in two provinces of Thailand. The purpose of the study, which used the questionnaire method, was to obtain data so that programs might be developed to meet the needs of Thai women in rural areas. USAID also supported this survey to make clear the impact all USAID programs might have upon rural Thai women. This document discusses the scope and methodology of the survey, gives a profile of the communities studied, and presents information on the socioeconomic status of the women in the two areas, including their financial, economic, social, and decision-making roles. It gives information derived from the survey on the attitudes of Thai men and women toward women, family size, their children's future, and family economics. It discusses the legal status of Thai women and the problems and needs of women and their communities; it gives conclusions and recommendations based

on the survey. Appendix 1 presents general statistics on Thailand's population, and Appendix 2 is a complete record of the survey data.

PN-AAE-439

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AGRICULTURAL DISTRIBUTION AND MARKETING

(312) FOODGRAIN AND OILSEED STORAGE IN PAKISTAN; AN ASSESSMENT OF THE SECTOR'S PROBLEMS AND PLANS

Pfost, H. B.; Anderson, D. E.; Briggs, William; Hugo, Cornelius
1976, 121p.

Kan. State (AID/ta-C-1162 GTS)

(In Grain storage, processing, and marketing rpt. no 63)

In October 1976, a four person U.S. study team visited Pakistan to assess its grain storage and marketing system. The visit was arranged by A.I.D. in response to a request from the government of Pakistan. In 1976, Pakistan produced 8.5 million tons of wheat—a million tons more than in 1975. Grain storage facilities in Pakistan are inadequate, and the government could not mobilize adequate facilities to store the hundreds of thousands of tons of wheat the farmers offered to sell at the existing procurement price. The grain had to be stored in facilities that afforded poor protection from weather, insects, rodents, and theft. Losses of the stored wheat were immense. Fertilizer offtake figures suggest a similar production increase for 1977. Recommendations of the study team for immediate action are: Damaged wheat stocks should be identified and sold immediately for animal food. An agency should be set up to coordinate grain storage activities in the public sector. Current grain stocks in good condition should be adequately protected from insect and moisture damage. In the medium term, studies should be conducted to determine the best storage facility locations and sizes. Alternative storage designs should be investigated. Marketing economists and technical personnel should be recruited and trained. In the long term, a thorough study of the post-harvest system should be made. A study of the entire marketing system should be made to find the best location and use for storage facilities and to examine the effects of government policies.

PN-AAE-059

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(313) EVALUATION OF THE MARKET SYSTEM AND POTENTIAL FOR AGRICULTURAL PRODUCTS IN PARAGUAY

Phillips, Richard; Borsdorf, Roe
1976, 188p.

Kan. State (AID/ta-C-1162 GTS)

(In Grain storage, processing and marketing rpt. no. 61)

While the strategy of increasing agricultural production is required for future economic growth of Paraguay, the constraints in the markets and marketing system for Paraguay's agricultural products preclude substantial production increases. This study assesses the future marketing potential of agricultural products, current market channels, and margins and prices in relation to domestic and export markets within Paraguay. The current and future situation are assessed with regard to: (1) projected production potential, (2) projected market volumes and distribution

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Index of Issuing Offices at the rear.

AGRICULTURE AND NUTRITION

patterns, (3) current market structure, and (4) constraints unique to the agricultural market of Paraguay. Crops surveyed include wheat, corn, rice, soybeans, tobacco, and cotton. Finds that there is no one solution to the overall problem. Attention must be given to altering the market system by concentrating on the effectiveness of the system. Plans must be made for balanced development and timing in both production and marketing. Government policies and programs must be coordinated. Resources must be brought to bear effectively. The program for development of crop production and marketing must be integrated with other agricultural development programs to insure balanced and integrated development of the total agricultural sector of Paraguay's economy.

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PLANT PRODUCTION

(314) SMALL SCALE INTENSIVE FOOD PRODUCTION, REPORT OF A WORKSHOP

Workshop on Improving the Nutrition of the Most Economically Disadvantaged Families, Santa Barbara, Calif., 1976; League for Int. Food Education 1976, 134p.

LIFE (AID/ta-C-1071 GTS)

In October 1976, the League for International Food Education (LIFE) conducted a workshop at Santa Barbara, California to exchange views on family food production efforts by private voluntary organizations and members of the agricultural science community. The workshop reviewed the state of the art of the French Intensive/Biodynamic Gardening technique for its applicability to Third World countries. This report presents the addresses, group reports, and summaries of discussions conducted during the three-day workshop. Some fifty participants explored the idea that a small-scale, low-input, high-output system of food production might be an appropriate technology to improve nutrition for many of the poorest families in the world. The reports of the working groups emphasized the importance of recognizing resource limits in Third World countries, of beginning with an assessment of local needs, and of understanding the sociocultural and environmental context of any proposed work program. They also stressed the value of establishing an open program of delivery systems to spread the theory and practice of small-scale intensive food production. Neither the agricultural scientists nor the organic gardeners changed their opinions about the values or dangers of using chemical fertilizers and pesticides. They interpreted small-scale intensive food production, not as a competitor of large-scale commercial agriculture, but as a supplement or alternative approach to improve the well-being of poor families. They also agreed that if intensive food production techniques were integrated with a philosophy based upon the relationship of man and nature, the method would be most effective in less developed countries. LIFE now needs to formulate a plan for field testing the validity of small-scale intensive food production under a variety of tropical conditions.

PN-AAE-068

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(315) COTTON PRODUCTION DECLINE IN PAKISTAN, 1971-76

Waddle, B. M.; Jones, S. E.; Richmond, T. R. 1977, 91p.

Experience (AID/afr-C-1130 GTS)

Presents the findings of a team of U.S. cotton experts who went to Pakistan to examine reasons for the large drop in yield per acre of cotton since 1972. A drop from four million bales in 1971-72 to two million bales in 1976-77 posed a serious economic problem to

the country and to the agriculture and textile industries. The team located the decline primarily in the upland cotton production area of the Punjab. This report includes analyses of information and data obtained by a lengthy field trip to six agricultural research locations. Assessments were made of facilities, staff capabilities, the relevance of research programs, and funding. The recommendations include: (1) better insect control, (2) improvement of seed quality, (3) strengthening of cotton breeding programs, (4) encouragement of ridge and line sowing, (5) establishment of a national cotton variety testing program, (6) better weed control, (7) improvement of land leveling, and (8) improvement of stands. The appendix to the report contains tables and graphs, and a discussion of insects.

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(316) PROCEEDINGS; SYMPOSIUM OF THE INTERNATIONAL SOCIETY FOR TROPICAL ROOT CROPS, 4th, CALI, COLOMBIA, 1976

Cock, James; MacIntyre, Reginald; Graham, Michael; Int. Development Research Centre, Ottawa 1976, 278p.

CIAT (AID/ta-G-1090 GTS)

In August 1976, more than 170 scientists from 44 countries took part in the Fourth International Symposium of the International Society for Tropical Root Crops, held at CIAT, in Cali, Colombia. These proceedings present 57 of the papers read at the symposium, along with summaries of discussions relating to the four topics addressed: the origin, dispersal, and evolution of root crops; basic productivity; preharvest and postharvest losses; and the use of root crops. The discussion of the first topic focused on the origin and evolution of yams, sweet potatoes, aroids, cassava, and potatoes. Discussion of topic two, productivity, concerned similarities and differences between tropical and temperate root crops, indices for yields, leaf growth hypotheses, photosynthesis, and the limitations on using models to describe plant growth in complex branching crops. The discussion of papers on preharvest and postharvest losses concerned the bacteria, viruses, and fungi known to cause plant disease, the increased threat of introducing diseases into new areas, and the need for a worldwide cooperative effort to monitor the world movement of pathogens. The discussion of the fourth theme, use of root crops, centered on three topics: the benefits of potatoes in the tropics; the inadequacies of the data presented on the potential protein value of potatoes in the tropics; and the benefits of other root crops in the tropics (mainly cassava and yam).

PN-AAE-061

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(317) INTERNATIONAL SORGHUM WORKSHOP PROCEEDINGS, UNIV. OF PUERTO RICO, 1975

International Sorghum Workshop 1976, 597p.

Puerto Rico (AID/ta-G-1184 GTS)

This document contains the papers, in English and in Spanish, presented at the international sorghum workshop in Puerto Rico in January 1975. The production of new and more nutritive varieties of sorghum, the effect of insects, diseases and nematodes on the cereal, and the human use of sorghum in different parts of the world were subjects considered at the workshop. Sorghum, one of the four major food grains of the world, is more tolerant to both drought and wet soil than corn,

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and it can produce more than one ratoon crop after harvest. The most important factor in limiting sorghum yields is moisture management. Weeds consuming moisture and moisture lost during tillage operations and surface evaporation are problem areas. A wide range of difference in digestibility exists within sorghums. It is desirable to combine better digestibility and satisfactory agronomic traits. It is possible to select and interbreed strains with improved amino acid balance and more starch components. Incorporation of these into agronomically acceptable strains is an integral part of the improvement program. About 400 million people are dependent on sorghum as a staple cereal. The major sorghum producing countries are Argentina and Mexico, but significant advances are possible in Brazil, Colombia, Uruguay, Paraguay, and Venezuela, by going to new and improved hybrids. Sorghum can also be used as fodder and stover to feed millions of animals which provide meat and milk for human consumption. Sorghum is also used for molasses, fiber, fuel, and alcohol.

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(318) IMPROVING YIELD AND QUALITY OF BEAN SEED PROTEIN AND THE DEVELOPMENT OF SUPERIOR POPULATIONS FOR COOPERATIVE UTILIZATION IN BREEDING PROGRAMS; PROGRESS REPORT, 1976

Bliss, F. A.; Wis. Univ. Dept. of Horticulture
1977, 49p.

Wis. (AID/ta-C-1173 Res.)

A PROJECT: To identify strains of the common bean, *Phaseolus vulgaris*, which consistently produce higher levels of seed protein, to combine high-yielding cultivars with protein-modified strains having enhanced nutritive value, and to develop cooperative arrangements with other improvement programs to evaluate selected materials and provide maximum use of promising selections.

DURATION: February 5, 1975-December 31, 1977

DEVELOPMENTS: This report discusses the research done in Wisconsin, Colombia, and Puerto Rico, on developing and evaluating high protein genotypes with wide-adaptability and multiple trait superiority. The results of the studies are presented and illustrated with many tables. Since food legumes are the sole protein source for nearly 50% of the population in many LDCs it is desirable to develop high-yielding, protein rich legume cultivars which complement cereals nutritionally and are economically competitive. Large seeded food legumes are able to biologically fix nitrogen and accumulate large amounts of seed protein. There is great variability among bean genotypes to accumulate protein in the seed. There is now a sound basis for developing strains with improved methionine content, and research is well underway in determining the effects of tannin. These studies are relevant for improving protein content in high yielding bean populations and for providing a model that is applicable to improving other traits in bean populations and other self-pollinated crops.

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(319) GENETIC IMPROVEMENT OF PRODUCTIVITY AND NUTRITIONAL QUALITY OF WHEAT; ANNUAL REPORT, 1976/1977

Nebraska Univ. College of Agr.
1977, 184p.

Neb. (AID/ta-C-1093 Res.)

A PROJECT: To engage in research on the genetic improvement of productivity and nutritional qualities of wheat. Wheat, consumed as whole wheat flour, can produce enough protein from an acre of land in one year to satisfy the protein needs of one

person for 877 days. This compares with 654 days for rice, 130 days for beef or hogs, and 185 days for poultry. Research is under the direction of the University of Nebraska.

DURATION: April 1974 to March 1978

DEVELOPMENTS: Reports on research during the period April 1976 through March 1977; discusses program activities in genetics and breeding, the chemical and physical characterization of nutritionally improved wheats, international evaluation of research, physiological studies of high-yield and high-protein metabolism, rat bioassays of high-protein and high lysine wheats, and information dissemination. Seed of nutritionally promising varieties in the collection (13,000 common wheats, 3,400 durums, and 673 spelt wheats) has been made available to most countries in which wheat is an important crop. Twenty-six high-protein lines selected from crosses of Atlas 66 with hard red winter varieties were publicly released as elite germ-plasm. Seed fractionation studies of Atlas 66, Nap Hal, and C.I. 13449 have shown the high-protein effect to reside entirely in the endosperm of Atlas 66 and largely in the endosperm of Nap Hal. Thus the high-protein effect is transmissible to white flour milled from these varieties and is not lost in the milling process. The high-lysine effect was not found in the endosperm of C.I. 13449 but in the aleurone of Nap Hal. Research at Nebraska has shown that high-quality protein can be extracted from the aleurone and added to the white milled flour to achieve elevated nutritional quality. This may be commercially feasible.

PN-AAE-125

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LIVESTOCK

(320) A STUDY OF SHEEP PRODUCTION IN TUNISIA

Sachse, J. M.
1977, 59p.

AID/NE/USAID/Tunisia (PASA 276-04-72 GTS)

Develops recommendations to help the Tunisian sheep industry become more efficient. One of the goals of the Tunisian Ministry of Agriculture's five year plan is to increase sheep production. The 5,600,000 people of Tunisia consume 15 kilograms of meat per person per year, and this consumption is expected to rise. Lamb seems to be preferred over beef, and the importation of meat has risen steadily. Thirty-four farms were visited for this study and consultations were held with various agricultural agencies. The report describes the current status of the sheep industry including production, imports, government objectives and programs, characteristics of Tunisian sheep breeds, sheep management, reproductive physiology, and sheep diseases. Specific and detailed recommendations are presented in the areas of nutrition, disease control, lambing, marketing, genetic improvement, management, and technical assistance. The study concludes that coordination between agencies and within the Integrated Livestock Project is fundamental to an effective extension sheep program and that USAID should assist in developing these programs.

PN-AAD-709

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(321) A STUDY OF MILK PRODUCTION IN TUNISIA

Kelso, B. F.
1977, 81p.

AID/NE/USAID/Tunisia (PASA 276-04-72 GTS)

Research indicates that the most efficient way to convert feed

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Index of Issuing Offices at the rear.

AGRICULTURE AND NUTRITION

nutrients into edible energy and protein is through milk production. In this study sixty-two Tunisian dairy farms were observed in the area bounded by Gabes on the southern coast, Bizerte in the north and the Jendouba LeKef area near the western border. These farms were studied for general farm setting, dairy facilities, physical appearance of the animals, types of feed, feeding rates, milk production level, and breeding practices. The recommendations made from this study are in the areas of nutrition, genetic improvement, housing of dairy cows, disease control, calf raising, dairy records, milk marketing, extension education programs, and government owned and operated farms. As the need for food increases, attention should be directed to systems of crop and animal production that will yield the greatest amount of high quality food nutrients. The author questions the advisability of programs which give preferential land to cereal production and preferential feeds for poultry and for bull fattening over that for milk production.

PN-AAD-708

Paper copy \$7.50
Microfiche \$1.00

SOIL RESOURCES

(322) SOIL RESOURCE INVENTORIES; PROCEEDINGS OF A WORKSHOP

Soil Resource Inventory Workshop, Cornell Univ., 1977; AID/TA/AGR 1977, 366p.

Cornell (CSD-2834 211d)

International efforts to improve agricultural productivity in developing countries have been hampered by the lack of a single international taxonomic system for surveying and recording the properties or resources of existing soils. These proceedings contain the papers and summaries of discussions of a workshop in April 1977, to obtain a review of a soil resource inventory program now being conducted at Cornell University. The purpose of the program is to develop a classification system for soil surveys that will provide mutually exclusive classes of soils defined by properties which can be recognized by non-soil scientists, independent of soil classification systems. The 30 papers, addresses, and discussion summaries in these proceedings cover eight topics: types and categories of soil surveys, evaluation of soil surveys and maps, case studies of soil survey methodology, soil survey techniques, methods of evaluating map characteristics, soil properties important for given land uses, presentations of soil resource data, and the role of soil surveys in the decision-making process for developmental planning.

PN-AAE-126

Paper copy \$31.15
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(323) MINERALOGICAL ASPECTS OF REACTIVITY TO PHOSPHORUS AMONG HIGHLY WEATHERED SOILS

Adams, Peter
1977, 124p.

Cornell (AID/ta-C-1104 Res.)

(Thesis M.S.—Cornell)

The applicability of the adsorption isotherm approach to characterizing reactivity of highly weathered soils to phosphorus was assessed for incubation periods of up to three months. Samples from 23 highly weathered soils from Puerto Rico, Brazil, Ghana, Venezuela, and Malawi were studied. Extractions of poorly ordered mineral fractions of the soils were carried out in order to

establish possible relations with reactivity of the soils to phosphorus. A given isotherm was prepared by reacting subsamples of a soil with KH_2PO_4 solutions covering a range of initial concentrations, with 0.01M CaCl_2 used as a carrier salt. Relations between final concentrations of P and P removed from solution by soil were found to conform to Langmuir and Freundlich isotherm treatment of the data for all incubation periods. However, evidence was found that equilibrium conditions, assumed in the Langmuir adsorption model, were not attained in short incubation periods. Estimation of poorly ordered mineral fractions in soils was attempted by extraction with 0.5M CaCl_2 , dilute HCl; cold, 5% Na_2CO_3 ; or acid ammonium oxalate in darkness. Values of aluminum extracted by dilute HCl or 5% Na_2CO_3 were found to correlate strongly with phosphorus sorption indices derived from isotherm data for all incubation periods. Values for iron extracted by dilute HCl or acid oxalate were found to relate poorly to reactivity indices, though correlations improved slightly for indices derived from longer term isotherms. Significant correlations were found between phosphorus reactivity indices and clay or organic matter content. The latter two factors were found to correlate strongly with Al extracted by dilute HCl or 5% Na_2CO_3 .

PN-AAE-479

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(324) PHYSICO-CHEMICAL PROPERTIES OF SUBMERGED SOILS IN RELATION TO FERTILITY

Ponnamperuma, F. N.
1977, 31p.

IRRI (AID/ta-G-1074 GTS)

(In IRRI research paper ser. no. 5)

The ability of soil to supply nutrients depends on the presence in the soil of adequate nutrients in forms that plants can absorb, the soil's ability to deliver nutrients by mass flow and diffusion to the root surface, the presence of a favorable ionic composition, and the absence of substances which interfere with movement of nutrients into the root. These factors are influenced by the physicochemical properties of the soils. A pH of about 6.6, an Eh of about 2 mmho/cm at 25 degrees C, and a temperature from 30 to 35 degrees C appear to favor nutrient uptake by rice. Under these conditions the availability of nitrogen, phosphorus, potassium, calcium, magnesium, iron, manganese, and silicon is high, the supply of copper, zinc, and molybdenum is adequate, and injurious concentrations of aluminum, manganese, iron, carbon dioxide and organic acids are absent. In normal tropical soils these conditions can be achieved by incorporating organic matter and keeping the soil submerged for 2 to 4 weeks before planting. This report includes many graphs and tables, and an extensive bibliography.

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PLANT PROTECTION

(325) THE MEDITERRANEAN FRUIT FLY AND ITS ECONOMIC IMPACT ON CENTRAL AMERICAN COUNTRIES AND PANAMA; A MULTIDISCIPLINARY STUDY TEAM REPORT

Mitchell, W. C.; Andrew, C. O.; Hagen, K. S.; Hamilton, R. A.; Harris, E. J.; Maehler, K. L.; Rhode, R. H.
1977, 193p.

Calif.—Berkeley (AID/ta-C-1195 GTS)

Fruit flies are thought to be an economic problem in Central America and Panama (CAP), but not enough data have been available to assess how serious the problem is. Accordingly, a seven person, University of California/A.I.D. team was

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selected to visit seven CAP countries, to assess the problems presented by the Mediterranean Fruit Fly (medfly) and other fruit flies (*Anastrepha* spp.), and to recommend needed actions to CAP policymakers. They concluded that the medfly was a minor pest to minor crops, and that it causes relatively small economic losses in CAP countries. USDA quarantine data on coffee and citrus fruit show that CAP imports are a lesser source of medfly introductions than imports from Hawaii. The medfly problem is only one among several related production and marketing problems for host fruits in CAP countries. Much research is needed to obtain information as a basis for action. Thirteen recommendations are made in this report. One is that technical assistance should be provided CAP countries to train people and to set up an integrated pest management program. Other recommendations concern standardizing trap data and fruit infestation data, the use of fruit fly parasites, and the need for a central quarantine facility. They also concern the use of malathion-bait sprays, citrus cultural practices, taxonomic aids, economic analyses, the need for a CAP Pest Management Program Center, and ways to strengthen the quarantine programs in CAP countries.

PN-AAD-264

Paper copy \$16.75
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(326) OBSERVATIONS ON SUGAR CANE DISEASES IN MOROCCO

Benda, G. T. A.
1977, 12p.

USDA/ERS (PASA 276-04-72 GTS)

Since Morocco is expanding its sugar cane industry, it is important to know whether phytosanitary problems exist which could lead to serious epiphytotics. Sugar cane cultivation is an excellent crop to study because it will grow on heavy soils; it survives winter flooding; and it grows as a monoculture. The crop can be left standing two or three years; it is tolerant to slightly increased salt control; it suffers from few leaf diseases; it shades out competing weeds; and sugar cane bagasse can be used to provide energy for sugar production. Sugar cane mosaic is the only major sugar cane disease in Morocco. This report describes the symptoms and treatments for the following sugar cane disease and disorders: ratoon stunting disease, stubble-piece and root diseases, disease of the stalk, leaf spots, physiological disorders of leaves, stunting, and Johnsongrass. The sugar cane experiments studied were in the Gharb, Loukkos, and the Moulouya. The report concludes with the following recommendations for maintaining the health of sugar cane in Morocco: index the cane to determine more definitely if ratoon stunting disease is present; continue rigorous quarantine of all cane brought into Morocco; and make every effort to prevent the establishment of Johnsongrass in the sugar cane.

PN-AAD-712

Paper copy \$2.00
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(327) SCREENING RICE FOR TOLERANCE TO MINERAL STRESSES

Ponnamperuma, F. N.
1977, 21p.

IRRI (AID/ta-1074 GTS)

(In IRRI research paper ser. no. 6)

Mineral stresses of rice plants induced by soil conditions include salinity, alkalinity, strong acidity, iron toxicity, histosol problems, zinc deficiency, phosphorus deficiency in wetland soils, and iron deficiency and manganese and aluminum toxicities in dryland soils. Chemical amendments and water control can lessen the problems in rice cultivation caused by mineral stresses, but they are both expensive. Breeding for tolerance to mineral

stresses may be simpler and less costly. To do this, reliable, rapid, and convenient methods of screening rice for stress tolerance are necessary. Developing these techniques is complicated. A mineral stress in rice soil usually is compounded by the presence of other mineral stresses and by environmental problems. The amount of the stress varies in space and with time. The reactions of the rice plant vary with method of planting, age of seedling, and stage development of the plant. These problems and the methods of overcoming them are discussed under various soil conditions.

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(328) DEVELOPMENT OF IMPROVED HIGH YIELDING SORGHUM CULTIVARS; ANNUAL REPORT, 1976/1977

Tex. A & M Univ.
1977, 73p.

Tex. A & M (AID/ta-C-1092 Res.)

A PROJECT: To convert exotic lines of sorghum into disease and insect resistant lines for use in temperate climates. Sorghum, one of the principal food and feed commodities of the world, has long been subject to such diseases as head smut, downy mildew, maize dwarf mosaic, anthracnose, charcoal rot, *Fusarium* stalk rot, and several common foliage diseases, and to insect losses from the sorghum midge, greenbug, banks grass mite, white grubs, sugarcane aphid. The Texas Agricultural Experiment Station initiated the research.

DURATION: February 1974 - February 1977

DEVELOPMENTS: Sources of new germplasm were supplied from converted and partially converted exotic sorghums. Disease and insect resistant dwarf height photoperiod insensitive sorghums were combined in random mating populations for easy distribution to sorghum improvement programs in LDCs and as research tools for improvement of grain sorghum in temperate regions. Breakthroughs have been achieved in development of greenbug resistant hybrids, high levels of midge resistance, and possible resistance to spider mites. Some of the disease and insect resistant sorghums have extraordinary general adaptivity. During the past year, several lines possessing tropical adaptation were identified and distributed for testing in a tropical nursery. A data management system was developed to permit more rapid summarization and distribution of cooperative international research findings.

PN-AAE-062

Paper copy \$6.80
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WOOD TECHNOLOGY AND INDUSTRIES

(329) POTENTIAL ECOLOGICAL IMPACT OF INCREASED INTENSITY OF TROPICAL FOREST UTILIZATION

Ewel, Jack; Conde, Louis
1976, 122p.

USDA/FS (PASA TA(AG) 03-75 Res.)

This literature review assesses the current state of published knowledge on the ecological impact which might result from increased tropical forest use. About 200 publications had direct relevance to the project; 90 percent of this data came from studies of Asian forests. Until recently, the logging of tropical forests was a selective process. As wood demands continue to rise there is a need to increase the technical capability of using a wider range of species and better silvicultural management. Intensive forest use and management applied to smaller areas can

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Index of Issuing Offices at the rear.

AGRICULTURE AND NUTRITION

provide a means for taking pressure off of other lands while permitting developing tropical nations to tap the high potential productivity of their forests. Used wisely, this could be an ecologically beneficial silvicultural tool which could be used to maintain tropical forests as highly productive, diverse ecosystems—a renewable tropical resource. This review has sections on potential ecological impacts on vegetation, soil, water, and animals. There is a brief discussion of research needs and conclusions drawn from the review. It is stressed that tropical forests must be managed as a renewable resource and that narrow clear cut strips avoid many of the disadvantages of forest clearcutting. The benefits of using a broader range of tropical woods include meeting wood needs from less land, permitting the maintenance of a diverse mixture of high-net-productivity ecosystems, combining food production with forestry, reducing the wastage of wood, and regenerating the whole forest system. Statistical data and an extensive bibliography were included.

PN-AAD-710

Paper copy \$10.90

Microfiche \$ 2.00

(330) EXPLORATORY KRAFT AND NSSC PULPING AND PRODUCTION OF A BLEACHED, MARKET-GRADE, KRAFT PULP FROM COLOMBIAN HARDWOOD MIXTURES

Laundrie, J. F.
1977, 18p.

USDA/FS (PASA TA(AG) 03-75 Res.)

(In AID rpt. no. 8)

The Forest Products Laboratory of the U.S. Forest Service conducts experimental research to establish potential uses for wood products native to developing countries. This report presents the methods and findings of a program to explore the making of kraft pulps from hardwoods in Colombia. Kraft pulps with a quality equal to or better than those made with North American hardwoods were made from three mixtures of 17 Colombian hardwood species. It was found feasible to use a high-yield process to produce 25 to 30 percent screenings for use in a corrugating medium, and to use the screened pulp for linerboard. Semi-chemical kraft pulp, with a Kappa number equal to that of the kraft screenings, had handsheet properties comparable to those of the kraft screenings. Handsheet tests indicated that a corrugating medium of acceptable quality can be made from all three mixtures cooked by the neutral sulfite semi-chemical process (NSSC). Improved handsheet quality can be obtained by the adding of caustic soda to the NSSC pulping liquor and/or by reducing the pulp yield. Semi-chemical kraft and green liquor pulps at 73 percent yield are deficient in the handsheet properties which are needed to produce a corrugating medium of acceptable quality.

PN-AAE-063

Paper copy \$2.00

Microfiche \$1.00

(331) LINERBOARD, CORRUGATING MEDIUM, AND CORRUGATED CONTAINERS FROM MIXTURES OF PHILIPPINE HARDWOODS

Koning, J. W.; Laundrie, J. F.; Fahey, D. J.
1977, 17p.

USDA/FS (PASA TA(AG) 03-75 Res.)

(In AID rpt. no. 9)

The Forest Products Laboratory of the U.S. Forest Service, in cooperation with the University of Wisconsin, conducts experimental research on the potential uses of wood products native to developing countries. This report presents the methods and findings of a program designed to assess the use of Philippine hardwoods in making linerboard, a corrugating medium, and corrugated containers. Corrugated fiberboard containers were

successfully made from nominal 42-pound linerboard consisting of 50 percent high-yield kraft Philippine hardwoods and 50 percent western kraft softwood pulp, and from a 26-pound corrugating medium made from 100 percent high-yield kraft Philippine hardwood screenings. The corrugating medium made from NSSC pulp fractured when fluted on the singlefacer at 20 feet per minute and minimum tension. Of the factors studied, only increasing the basis weight or applying starch as a surface size improved the bursting strength to 100 or above. Screened pulp from high-yield digestions had about the same bursting and tensile strengths as the fully cooked pulp, but about 13 percent less tearing resistance.

PN-AAE-064

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(332) PROPERTIES OF 50 INDIVIDUAL PHILIPPINE HARDWOOD BARKS AND MIXTURES OF 22 GHANAIAN AND 18 COLOMBIAN HARDWOOD BARKS

Wahlgren, H. E.; Laundrie, J. F.
1977, 14p.

USDA/FS (PASA TA(AG) 03-75 Res.)

(In AID rpt. no. 10)

Most of the tropical hardwood forests are located in developing countries, and if these hardwoods were efficiently used, under sound conservation practices, they could greatly aid the economic growth of tropical countries. Because so many species of hardwoods are mixed in tropical forests, techniques must be found of producing economical products from mixtures of hardwood. This report presents methods and results of a research program conducted to assess the properties of bark from 50 species sampled from the tropical forests of the Philippines. The research was conducted by the Forest Products Laboratory, U.S. Forest Service, in cooperation with the University of Wisconsin. The study findings showed that the specific gravity of the bark tends to be higher than the specific gravity of the 50 Philippine hardwoods evaluated, except for species having a specific gravity of 0.70 and greater. Silica and ash contents of the barks were much higher than in the woods. Kraft pulp yields from bark were somewhat less than those found for barks from Temperate Zone species. Heat value was similar to that found in barks of native U.S. species.

PN-AAE-065

Paper copy \$2.00

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(333) HARDBOARDS FROM MIXTURES OF COLOMBIAN AND GHANAIAN HARDWOODS

Myers, G. C.
1977, 12p.

USDA/FS (PASA TA(AG) 03-75 Res.)

(In AID rpt. no. 11)

The Forest Products Laboratory of the U.S. Forest Service conducts a wide range of experimental studies designed to assess economical uses of forest products. This report discusses the methods and results of a project to establish the suitability of hardwood mixtures from Colombia and Ghana for the manufacture of hardboard. Low energy was required to fiberize the chips into hardboard fiber. High-density hardboards made from both chip mixtures by both dry- and wet-formed processes met the Voluntary Product Standard for standard hardboard, except for dry-formed hardboards with two percent resin. Dry-formed,

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AGRICULTURE AND NUTRITION

medium-density hardboard made with urea resin had strength properties suitable for furniture core stock. Medium-density hardboard made with phenol-resorcinol resin had strength and accelerated aging properties suitable for exterior siding application. All hardboards had excellent surface characteristics, which are desirable in finishing.

PN-AAE-066

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(334) EVALUATION OF NSSC AND KRAFT PULPS FROM DIFFERENT AVERAGE DENSITY MIXTURES OF PHILIPPINE HARDWOODS

Laundrie, J. F.
1977, 13p.

USDA/FS (PASA TA(AG) 03-75 Res.)

(In AID rpt. no 12)

One means of accelerating the economic development of LDCs in the tropics is to identify technical processes for producing competitive products from the forests in those countries. The Forest Products Laboratory of the U.S. Forest Service is engaged in such research. This report presents the methods and results of research to evaluate neutral sulfite semi-chemical (NSSC) and kraft pulps made from Philippine hardwoods which differ in their densities. Four Philippine hardwood chip mixtures with average densities of 12, 25, 35 and 45 pounds per cubic foot were pulped by both the NSSC and kraft processes. The kraft pulps were easily bleached to 90 percent or more brightness using CEDED. The highest NSSC pulp handsheet properties were obtained using the lowest average density wood mixture, and all properties decreased as the average wood mixture density increased. Kraft pulps of maximum strength were obtained from wood mixture having an average density of 35 pounds per cubic foot.

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For other items on wood products, see ARDA 5:1, nos. 51-53.

FISHERIES

(335) ANNUAL REPORT FOR 1976

Auburn Univ. Int. Center for Aquaculture
1977, 16p.

Auburn (CSD-2780 211d)

A PROJECT: To strengthen the research, teaching, and extension capabilities of Auburn University so it can make more significant contributions in promoting aquaculture in developing countries. Aquaculture is becoming more important in developing countries as a means of providing larger quantities of protein needed for adequate diets and as an important contribution to economic growth.

DURATION: 1970-1978

DEVELOPMENTS: This report summarizes the activities of the International Center for Aquaculture during fiscal year 1976, particularly as related to support received from A.I.D. A highlight of the year was the 78 man months of overseas service performed by Center staff. Academic and training programs were strengthened with the initiation of new courses in fish genetics and breeding, aquacultural economics, and a special five month aquacultural training program for foreign students. In total 656 students (504 American and 152 foreign) were enrolled in fishery subjects taught during the year. Country projects were operational in the Philippines, Brazil, Nigeria, and El Salvador. In addition, 19 special requests for international development services were received and appropriately serviced during the year. Grant funds were utilized during the year to support 270

man months of personnel services. The services contributed significantly to the capability of the Center in the areas of education and training, extending the knowledge base, advisory capacity, information capacity, and linkages and networks.

PN-AAE-056

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WATER RESOURCES

(336) IMPROVING AGRICULTURAL WATER USE, ORGANIZATIONAL ALTERNATIVES

Radosevich, G. E.
1977, 153p.

AID/TA/RD

This state-of-the art review of the legal aspects of water user associations gives a pragmatic description of the types of associations that exist in different parts of the world. It is intended to assist agricultural development in rural areas by promoting the use of mutually acceptable organization schemes, together with the introduction of intermediate technologies and improved water use practices. It focuses on the forms of water user associations and their attributes for inducing and achieving more efficient, effective water and related agricultural resource use. In order to examine the kinds of organizational alternatives for water user associations, the organizational characteristics of several countries were subjected to analysis. Guidelines are given for the selection and formation of the type best suited to achieve improved water management and agricultural development. Existing policies and organizations are considered. These guidelines cover a broad range of factors, and they provide a framework for evaluation, rather than a solution to each particular problem.

PN-AAD-823

Paper copy \$13.45
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(337) IRRIGATION INSTITUTIONS AND WATER USERS IN ECUADOR

Anderson, D. C.
1977, 153 p.

Utah State (AID/ta-C-1103 Res.)

Examines how to improve water management at the small farm level in Ecuador. The objectives of the study were to discover the different types of irrigation institutions operating in the Andean Region of South America, to identify the relationships between them and water users, and to identify common characteristics of irrigation organizations which facilitate or inhibit the efficient use and management of water. Part 1 describes the geography, climate, population, agriculture, water resources, and irrigation institutions in Ecuador. Part 2 is an analysis of the survey data from 35 organizations and 171 personal interviews. Comparative costs of operation and maintenance of systems, forms of payments of water fees by users, comparative user attitudes, and life-style, and comparisons of delivery infrastructure characteristics are discussed. Recommends the kinds of assistance which a government program could offer a private irrigation institution. The appendix contains the two questionnaires and comparative readout tables prepared from the statistical results of the field surveys in Bolivia, Chile, Colombia, and Ecuador.

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AGRICULTURE AND NUTRITION

FOOD PROCESSING

(338) LOW-COST EXTRUSION COOKERS, INTERNATIONAL WORKSHOP PROCEEDINGS

Harper, J. M.; Jansen, G. R.; Wilson, David; Stumpf, Peggy
1976, 178p.

USDA/ERS (RSSA 1-74 GTS)

Contains the papers and discussions from a workshop held in 1976 at Fort Collins, Colorado, which brought together 50 persons from 15 countries concerned with the development of low-cost extrusion cookers (LECs). LECs are machines which produce nutritious, low-cost foods, and the focus of the conference was on developments in the technology transfer of LECs to the developing countries for use in nutrition programs. The conference papers examine A.I.D.'s nutrition program and the part LECs play in it, LEC research and development at Colorado State University, physical and chemical evaluations of extruded food products, and manufacturers' experiences with the Brady Corp. Cooker and the Insta-Pro Extruder. The editors note that the feasibility of transferring LEC technology to LDCs has been demonstrated, and a series of the conference papers detail these developments. Extrusion equipment has been or is being tested in India, Indonesia, Kenya, Bolivia, Sri Lanka, Guatemala, and Costa Rica. Other countries interested in or developing programs include Honduras, Chile, Tanzania, Mali, Pakistan, and The Philippines. Extruded food products are being used in nutrition programs in Bolivia ("Maisoy") and Sri Lanka ("Thriposha"), and acceptability tests are underway or planned in Honduras, Ecuador, Panama, Kenya and Tanzania. The workshop served as a focus for sharing experiences and for planning future LEC program directions and needs.

PN-AAD-522

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(339) DEVELOPMENT OF A PROCESS FOR THE PREPARATION OF COCONUT PROTEIN PRODUCTS FOR USE IN FOODS, FINAL REPORT

Tex. A&M Univ. Food Protein R&D Ctr.
1976, 190p.

Tex. A&M (CSD-2804 Res.)

Reports on investigations to develop a commercially viable process for the quantitative recovery of high quality coconut oil, as well as food grade protein products. A large segment of the population of coconut producing countries consume diets low in protein. Many of these countries import large quantities of protein foods. If an alternative to imported protein could be developed from indigenous crops, it would improve the import-export balance and produce new industries and new income for the people. The common method of processing coconuts causes considerable loss or damage of coconut oil. The investigations reported here focus on four areas: (1) the fundamental properties of coconut proteins, (2) the principles of separating the oil and protein phases by centrifugal force in aqueous medium, (3) the recovery of food grade protein products by more traditional technology based on the use of desiccated coconut of food grade copra, and (4) the ultrastructure and biochemical development of coconut meats to provide information useful in the production, harvesting and processing of coconut.

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(340) PROCEEDINGS OF A SEMINAR ON THE FOOD INDUSTRY IN WEST AFRICA, UNIV. OF GHANA, 1974

AID/TA/N
1975, 145p.

AID/TA/N

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

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HUMAN NUTRITION

(341) GLOBAL MALNUTRITION AND CEREAL FORTIFICATION, CHAPTS. 1-6: CEREAL FORTIFICATION

Austin, J. E.; Harvard Univ. School of Public Health
1977, 179p.

Harvard (AID/ta-C-1172 GTS)

Presents an analytic framework to assess the feasibility of fortification interventions. Over half of the developing world's population suffers from nutritional deficiency. Global malnutrition is clearly one of the most pressing problems facing the international community. In the 1960s, the problem was oversimplified as a protein gap, and cereal-grain fortification was seen as the ideal solution. However, field research in the 1970s has revealed that the effects of fortification are far less automatic or dramatic than was presumed. Fortification is only one of several intervention options, many of which can be used together. The question for planners is the desirability and feasibility of fortification intervention for their nations. That issue is the focus of this study, and it examines fortification of three cereals: rice, wheat, and maize. The barriers to fortification lie in five categories: nutritional need (whether improved nutrient quality will alleviate certain deficiencies) structure of the commodity system (which block access to target groups), technology (which may be excessively complicated), consumer acceptability, and intervention economics (costs vs. benefits of fortification). Each of these barriers is examined in a separate chapter. The last three chapters apply the methodology for examining fortification barriers in Guatemala, Tunisia, and Thailand.

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(342) GLOBAL MALNUTRITION AND CEREAL FORTIFICATION, CHAPT. 7: CASE STUDY, GUATEMALA

Austin, J. E.; Harvard Univ. School of Public Health
1977, 111p.

Harvard (AID/ta-C-1172 GTS)

To establish whether fortification intervention is feasible in any given developing country, planners must assess the factors of nutritional need, consumer acceptance, target group coverage, commodity system structure, technology, and costs vs. benefits. The application of this methodology to Guatemala shows that intervention will not succeed without protein supplements to eliminate calorie deficits in low-income groups, particularly among preschool children. The fortificant mix must vary to meet

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regional needs. The structure of the commodity system may require a dual approach to fortification interventions. Rural consumers are best reached through a network of nixtamal millers. Urban consumers are best reached through the central processing of commercial tortillas. Because of the tremendous cost of such a program, governments should elect target-group coverage instead of complete national fortification as their goal. Targeting can be regional, or on a village by village basis. Cost computations for one of the six regions of Guatemala show that a fortification program would cost \$9.1 million. The government would have to bear this cost.

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(343) GLOBAL MALNUTRITION AND CEREAL FORTIFICATION, CHAPT. 8: CASE STUDY, TUNISIA

Austin, J. E.; Harvard Univ. School of Public Health 1977, 140p.

Harvard (AID/ta-C-1172 GTS)

To establish whether fortification intervention is feasible in a developing country, planners need to assess such factors as nutritional need, consumer acceptance, structure of the commodity system, and costs vs. benefits. This methodology, applied to Tunisia, shows that intervention through the small local mills in Tunisia is a feasible means of fortifying wheat. The most serious problem is the high cost of such a program, and funds would need to be provided by bilateral and multi-lateral donors as well as the Tunisian government. Such funding would have to cover the initial capital costs and a major portion of the annual operating costs over an extended time. Recent dramatic increases in the price of fortificants, mainly lysine, and the lack of control over prices, means that program costs might be much higher than estimated. If only micro-nutrient fortification is undertaken, the price impact would not be as serious.

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(344) GLOBAL MALNUTRITION AND CEREAL FORTIFICATION, CHAPT. 9: CASE STUDY, THAILAND

Austin, J. E.; Harvard Univ. School of Public Health 1977, 69p.

Harvard (AID/ta-C-1172 GTS)

In Thailand, where cereal, particularly rice, is the dietary staple, fortification of rice is a promising way to reduce malnutrition. This chapter discusses a set of five barriers that must be addressed in a fortification program: nutritional need, commodity system structure, technology, consumer acceptability, and intervention economics. Special emphasis is given to rice milling and the unique set of problems this presents for nutrition intervention. The pilot project conducted in Thailand showed that nutritional deficiencies exist in a large part of the population. The technology for the fortification process is available and can be used in a centralized or decentralized system. However, fortification is not an invisible intervention. Consumers interviewed in the pilot project villages said they could distinguish fortified rice, and that it had an undesirable taste, odor, color, and cooking characteristic. Yet most said they were willing to eat fortified rice if it was beneficial. The major drawback of the current fortification project is the cost. The government might consider micro- rather than macro-level fortification. In rural areas, this could easily be done through day care centers. In urban areas, micro-fortificants could be added to the rice sold to low-income consumers through the government-subsidized shops.

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(345) GLOBAL MALNUTRITION AND CEREAL FORTIFICATION, APPENDICES

Austin, J. E.; Harvard Univ. School of Public Health 1977, 110p.

Harvard (AID/ta-C-1172 GTS)

Contains the 22 appendices of the Harvard study on global malnutrition and cereal fortification. The study presents a methodology to assess the feasibility of fortification intervention in any developing country, and it presents case studies of Guatemala, Tunisia, and Thailand. The appendices include: (1) an annotated bibliography; (2) chemical structures of commercially produced vitamins; (3) chemical structures of commercially produced amino acids; (4) a process for the industrial production of L-Lysine. HCL; (5) industrial processes for the production of soy proteins; (6) a process for production of fish protein concentrate; (7) a diagram of flour milling and premix addition in centralized mills; (8) a Tunisian village wheat mill (drawing and specifications); (9) the manual procedure for fortifying semolina and flour at a village mill; (10) a description of the infusion production of amino acid and vitamin enriched rice kernels; (11) an outline of the simulated kernel process; (12) cost estimates of the extrusion cooking system; (13) a description of the Maillard Browning Reaction; (14) the Strecker degradation; (15) reactions leading to vitamin degradation; (16) the moisture content of cereals at different humidities and temperatures; (17) the social costing and shadow pricing of foreign exchange, (18) the regions of Guatemala; (19) basic elements in fortification feasibility analysis; (20) size estimates of the non-controlled grain purchase system; (21) groups participating in the controlled system of grain purchases; (22) and the first estimate of number of mills and grinders in Tunisia.

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(346) EVALUATION METHODS FOR CHILD FEEDING PROJECTS IN DEVELOPING COUNTRIES, FINAL REPORT: CHAPT. I, INTRODUCTION AND SUMMARY

Lerner, H. A.; Manly, R. P.; Eighmy, T. H.; Checchi and Co. 1977, 22p.

Checchi (AID/CM/otr-C-73-199 GTS)

(Chapts. II, 53p.: PN-AAE-074; III, 121p.: PN-AAE-075; IV, 116p.: PN-AA-076)

A need exists to improve the methods for economically evaluating the effectiveness of supplemental feeding programs for mothers and children in developing countries. This report presents the design and results of a pilot study to determine whether supplemental feeding programs at five sites in three countries could be effectively assessed by means of a cross-sectional survey. In each of the countries (Colombia, the Philippines, and Kenya), national survey research organizations gathered background information, interviewed participants and nonparticipants in programs conducted at maternal-child health centers and school programs, and measured participating children. The results of the study were too ambiguous to be used as a basis for making judgments concerning the relative effectiveness of the feeding programs examined. Hence the methodology, as tested, cannot be recommended as a proven approach that is clearly superior to other evaluation methodologies currently in use. Emphasis in future studies should be placed on objectively verifiable physical measurements of the nutritional status of chil-

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AGRICULTURE AND NUTRITION

dren; on determination of the actual ration size served at the site; and on the accurate determination of length of exposure to the program. There also needs to be tested and observable indicators of family and community background; shorter and simpler survey instruments; a larger number of sites in a country; and the incorporation of a longitudinal or time dimension through many site or cohort measurements.

PN-AAE-073

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(347) EVALUATION METHODS FOR CHILD FEEDING PROJECTS IN DEVELOPING COUNTRIES, FINAL REPORT: CHAPT. II, PERSPECTIVES FOR PROGRAM OFFICIALS

Lerner, H. A.; Manly, R. P.; Eighmy, T. H.;
Checchi and Co.
1977, 53p.

Checchi (AID/CM/otr-C-73-199 GTS)

(Chaps. I, 21p.: PN-AAE-073; III, 121p.: PN-AAE-075; IV, 116p.: PN-AAE-076)

Improved methods of evaluating supplemental feeding programs are needed. To test the efficacy of a cross-sectional survey methodology for evaluating supplemental feeding programs, a pilot study was conducted of two types of programs at five sites in each of three countries: Colombia, the Philippines, and Kenya. The study results were ambiguous. Thus the methodology tested is not recommended as an effective means of evaluating the efficiency of supplemental feeding programs. This chapter of the report on the study is written for program officials. It explains the evaluation methods the report recommends for future studies, identifies key issues involved in those methods, and describes some important technical concepts in nontechnical terms. This chapter provides a broad perspective on evaluation studies; defines the specific orientation of evaluation methods recommended; and lists the criteria considered in selecting those methods. It also discusses A.I.D.'s logical framework for program officials outside of A.I.D. and presents a logical framework designed as a master charter for the types of evaluations recommended in this report. It discusses the analysis of linkage processes in evaluating child feeding operations. Examines the use of multivariate analysis and other statistical techniques and provides a retrospective view of the chapter.

PN-AAE-074

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(348) EVALUATION METHODS FOR CHILD FEEDING PROJECTS IN DEVELOPING COUNTRIES, FINAL REPORT: CHAPT. III, GUIDELINES, PROCEDURES, AND FORMS

Lerner, H. A.; Manly, R. P.; Eighmy, T. H.;
Checchi and Co.
1977, 121p.

Checchi (AID/CM/otr-C-73-199 GTS)

(Chaps. I, 21p.: PN-AAE-073; II, 53p.: PN-AAE-074; IV, 116p.: PN-AAE-076)

Methods of evaluating child feeding programs need to be improved so that highly effective programs can be identified and used as models for improving less effective programs. To test a methodology for evaluating supplemental feeding programs, a pilot study was conducted in Colombia, the Philippines, and Kenya. The study results showed that the cross-sectional survey methodology employed is not adequate. The study results were

used as a basis for developing guidelines for more effective future studies. This chapter of the study report presents guidelines, procedures, and forms for use in evaluative studies of feeding programs. It explains how to conduct site-level core evaluations of two kinds: weight dispersion measurements and special assessments. Weight dispersion measurements at school or maternal-child health sites entail a set of procedures which include selecting sites, selecting children at the sites, measuring and weighing the children, recording the measurements, calculating weight dispersion measures, analyzing and reporting the data gathered, and recording certain other information offered at the site. The main purpose of weight dispersion measurement is to provide program officials with anthropometric indicators of the nutritional status of children at that site. Normally this information is expected to be gathered once each year.

PN-AAE-075

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(349) EVALUATION METHODS FOR CHILD FEEDING PROJECTS IN DEVELOPING COUNTRIES, FINAL REPORT: CHAPT. IV, AN ANALYSIS OF PILOT STUDY SURVEY DATA IN THREE COUNTRIES

Lerner, H. A.; Manly, R. P.; Eighmy, T. H.;
Checchi and Co.
1977, 116p.

Checchi (AID/CM/otr-C-73-199 GTS)

(Chaps. I, 21p.: PN-AAE-073; II, 53p.: PN-AAE-074; III, 121p.: PN-AAE-075)

In an effort to develop improved means of evaluating supplemental feeding programs in developing countries, a cross-sectional survey methodology was tested in a pilot study of feeding programs in Colombia, the Philippines, and Kenya. This chapter of the final report on the study contains a detailed discussion of the design of the analysis, the variables analyzed, and the results of the analysis. Analyses of data using the individual child as a unit of observation were generally inconclusive. The inconclusive findings are believed to be the result of imprecision in measurement of surrogates for program exposure, defined as size of ration consumed and length of participation in a supplementary feeding program. Such measurement problems are characteristic of the cross-sectional approach. Maternal-child health (MCH) programs appear, in general, to be more effective in meeting community nutritional needs than school feeding programs. As expected, MCH programs reach poorer families, mothers, and newly weaned children at times when their nutritional needs are greatest. However, costs per child for MCH programs are higher than for school feeding programs. Given the prevailing system for giving out MCH rations, much of the supplemental food is consumed by persons other than the targeted pregnant and lactating mothers and pre-weaned or post-weaned children. School feeding programs appear to be most effective when they provide a high protein supplement to sustain growth. A Weight Dispersion Measure developed in this study offers advantages over "Percent of Standard Weight-for-Height" as a means of measuring the nutritional impact of a feeding program.

PN-AAE-076

Paper copy \$10.40
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(350) INTEGRATING NUTRITION PLANNING CONCERNS INTO AGRICULTURE AND HEALTH SECTOR ANALYSIS

Intech, Inc., Silver Spring, Md.
1976, 138p.

Intech (AID/ta-C-115 GTS)

This report investigates ways in which two important development planning techniques, agriculture and health sector analysis, can be used in nutrition planning. The main objective of health

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sector analysis is to develop the specific information needed to understand the exact way the various determinant factors—water supply, environmental sanitation, and the frequency and duration of illness—interact to affect nutritional status. Once these relationships are known, the alternatives available for combating malnutrition must be submitted to a cost/benefit analysis. The purpose of agriculture sector analysis is to devise agricultural programs which increase food production while reducing problems of underemployment, unequal income distribution, and low levels of living. The report uses analyses from Portugal, Panama, Colombia, the Dominican Republic, India, and the Punjab as illustrative models. These elements are also included: (1) a review and synthesis of the requirements for nutrition analysis and planning; (2) determination of which nutrition analysis requirements could be fitted logically into the structure of sector analysis; and (3) specification of possible extensions to existing sector analysis methodologies, in order to fulfill nutrition analysis requirements. There is an extensive bibliography.

PN-AAD-435

Paper copy \$12.20
Microfiche \$ 2.00

(351) GUIDELINES FOR THE ERADICATION OF VITAMIN A DEFICIENCY AND XEROPHTHALMIA, A REPORT

International Vitamin A Consultative Group
1976, 48p.

Nutrition Found. (AID/ta-C-1375 GTS)

Effective elimination of vitamin A deficiency in any particular population requires a comprehensive program. This report provides information useful for designing effective programs. It discusses ways to assess vitamin A status, to select intervention strategies, and to evaluate the strategies. It gives the research needs in present and future vitamin A programs and the recommendations of the International Vitamin A Consultative Group (IVACG) concerning research and development needs. IVACG recommendations include the following: A permanent Secretariat and information clearinghouse on vitamin A should be set up as soon as possible, as should a reference library. A roster of experts in different areas of vitamin A programming should be compiled. Projects should be set up to develop better ways to determine vitamin A precursors and to standardize methods of collecting and storing tissues in preparation for vitamin A assays. Research should be supported on the physiology of vision, on staining techniques to determine xerosis conjunctivae, and on the relationship between vitamin A deficiency and taste impairment and color discrimination. Research should be done on which foods for various populations are suitable for fortification, and on the absorption, storage, transportation, and excretion of vitamin A supplied by intermittent high-level dosing. Groups or sections within existing institutes or centers should be encouraged to focus specifically on the problem of vitamin A nutrition.

PN-AAD-751

Paper copy \$4.75
Microfiche \$1.00

(352) DEVELOPMENT OF HOUSEHOLD FOOD BEHAVIOR MODELS

Poynor International, Inc. Silver Spring, Md.
1976, 98p.

Poynor (AID/ta-C-1318 GTS)

Economic factors influencing family food consumption can be analyzed by means of linear programming models, if input data are accurate and complete. This study evaluated methods for analyzing economic factors influencing family food consumption. Two linear programming models were developed: one to analyze urban household food consumption, and the other to

analyze the relationships between production and consumption decisions for rural households. The urban model was tested in four countries (Bolivia, Colombia, the Dominican Republic and Guatemala) and the rural model in one country (Guatemala). The urban models were constructed to facilitate comparisons with survey data on average food consumption at various income and food budget levels. Results of the analyses showed that low-income urban families in the four countries attempt to follow a preferred dietary pattern, and that their buying decisions are quite rational. Food prices and the size of food budget are the most important factors influencing these decisions, for they explain almost all of the variation observed in calorie and protein consumption. The results of the farm decision model show that the single most important factor affecting the production and consumption decisions of small farmers is the level of available operating capital. When this supply of capital is ample, farm income is high and derives chiefly from production of cash crops. When the supply of capital is restricted, the amount of land dedicated to cash crops diminishes, the use of hired labor decreases, and production of subsistence crops increases.

PN-AAE-104

Paper copy \$8.90
Microfiche \$1.00

(353) AN OPERATIONS ORIENTED STUDY OF NUTRITION AS AN INTEGRATED SYSTEM IN THE STATE OF TAMIL NADU

Cantor, S. M.; Associates Inc., Haverford, Pa.
1973, 218p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 1)

To improve the planning and execution of nutrition programs in Tamil Nadu, India, the Tamil Nadu Nutrition Study was initiated in late 1970. Its objectives were to describe and analyze the nutrition system, to identify points for intervention to achieve significant changes in the survival of children, and to propose specific action programs. Pilot studies were done for three sub-systems: agricultural production, food processing and distribution, and consumer behavior. The findings include the following: About half the families in Tamil Nadu are receiving less than 80 percent of their calorie needs. Groups needing special attention are the weaning child, the pregnant or nursing mother, and the adolescent female. The cultural constraints on food consumption behavior are profound. Improved nutrition can be provided to target groups not only by improved income, but also by improved food delivery systems and appropriate nutrition education of family decision-makers. Family planning programs will not succeed until improved nutrition increases the current survival rate of children (to age six) of 555 per 1,000 live births. The comparable North American and European rate is 960. The Tamil Nadu Study developed a system of analytical methodology specially suited to nutrition planning. The beginning of a state data base has been achieved.

PN-AAD-772

Paper copy \$18.85
Microfiche \$ 3.00

(354) CULTURAL ANTHROPOLOGY AND NUTRITION

Ashkenaz, Eleanor; Krishnamurthy, Lakshmi; Thiagarajan, Deborah; Moffatt, Michael; Apte, Judith; Cantor, S. M., Associates Inc., Haverford, Pa.
1973, 277p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. B; Field rpts.)

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AGRICULTURE AND NUTRITION

Cultural and religious beliefs and practices pose serious impediments to improving the nutritional status of pregnant and lactating mothers and small children in India. The problems are discussed in this volume, which is a compilation of five papers and reports on world infant malnutrition, including a description of cultural influences on food behavior in the State of Tamil Nadu, India. As the pregnant mother in Tamil Nadu approaches her delivery date, she is increasingly restricted by custom and taboo. Her diet is severely limited by economics and by beliefs that bear no relationship to concepts of adequate nutrition. When the child is born it is subjected to prohibitions and restrictions stemming from beliefs about spells, sins, and the evil eye. Infant malnutrition tends to be perpetuated by the restriction of foods classified in the Ayurvedic hot/cold system as taboo. Family food is shared on the basis of size and of work output. Thus, though the mother and infant child are cherished and protected, they do not receive food adequate in quantity or nutritive quality. In this sense, family subsidy programs for adequate nutrition are less productive than they might appear. Also, such programs may be detrimental to family planning since having more children may be seen as a way to obtain more subsidized food for the family.

PN-AAD-774

Paper copy \$23.75
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(355) NUTRITION INTERVENTION, A STUDY OF TAKE-HOME DRY FOOD AS A DISTRIBUTION SYSTEM

Rajagopalan, S.; Cantor, S. M., Associates Inc., Haverford, Pa. 1973, 165p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. C: Field rpts.)

As part of the Tamil Nadu Nutrition Project in India, a trial program was introduced to determine the effectiveness of take-home distribution as a means of feeding children from the time of weaning through two years of age. The effectiveness of the delivery system was tested by measuring the nutritional status of children being fed take-home food, as compared to a control group. Over a one-year period, the children in the experimental group showed statistically significant increases in weight gain. Future experimental programs should include nutrition education as a component. An initial lag time in this demonstration program resulted from maternal suspicion and testing of food by other family members before some of it was given to the infant. To compensate for such dilution, future studies should include, instead of one child per family, all children up to school age (six years old). Participation in both the experimental group (61 percent) and the control group (47 percent) could be improved in future studies by including incentives such as a plastic toy or other gadget. Introduction of such an incentive midway through the project stimulated lagging participation. The take-home demonstration study was a success. Provided the operational recommendations are heeded, subsequent trials could be even more successful.

PN-AAD-775

Paper copy \$14.45
Microfiche \$ 2.00

(356) AN ORGANIZATIONAL ALTERNATIVE FOR CHILD NUTRITION PROGRAMMING: TAMIL NADU CHILDRENS COMMISSION

Kothari, K. B.; Cantor, S. M., Associates Inc., Haverford, Pa. 1973, 50p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. D, pt. 1)

This paper reviews past studies of administrative organizations and programs in the State of Tamil Nadu, India. One of the most persistent and difficult problems underlying maternal and child

malnutrition in LDCs is the less than effective ways in which the national and state governments are administratively organized to make full use of funds and other resources provided by donor agencies. Well-conceived programs often become splintered, transformed, and dissipated when their functions are assigned to existing agencies too inflexible to assign the needed priority to new functions. This paper proposes that the State government establish an autonomous Tamil Nadu Children's Commission. Its purpose would be to meet first-priority needs of child development in the areas of nutrition, health, and education by providing adequate resources, leadership, policy formation, and evaluations of program effectiveness. The paper describes the functions, organizational structure, and proposed activities of the Commission.

PN-AAD-776

Paper copy \$4.90
Microfiche \$1.00

(357) A STUDY OF FEEDING PROGRAMS IN TAMIL NADU

Schaefer, Kalmann; Cantor, S. M., Associates Inc., Haverford, Pa.

1973, 90p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. D, pt. 2)

Supplementary feeding programs designed to combat malnutrition among pregnant and nursing mothers, preschool children, and school children can be improved through evaluation. This was the rationale for an evaluative field study in 1971 and 1972 of the nine feeding programs operating in the State of Tamil Nadu, India. The feeding programs were in general found to be effective delivery systems, although the food is usually consumed as a substitute for, rather than a supplement to, the usual dietary intakes of low-income families. Caloric deficiencies were found to be more widespread than protein deficiencies among the target group (families with incomes below Rs. 300 per month). The nine distinct supplementary feeding programs in the state feed only 12 percent of the preschool target population, but 52 percent of the school children require supplemental food. Feeding program administrators are mainly concerned with accountability for food delivered, rather than estimates of actual consumption by particular beneficiaries and the effects of total intake on health. Feeding programs conducted at the balwadies can be made more efficient, but this would require additional financial resources and manpower. The present mid-day meal program should not be expanded. Programs directed toward preschool children and pregnant and nursing mothers should be rapidly expanded. The existing 30,000 schools in the state should be used to reach those target groups. The government should support more research on pre-cooked food technology, since pre-cooked foods would introduce more flexibility into the food distribution systems. Future evaluations of the feeding programs should be conducted by a department separate from those responsible for administering the programs.

PN-AAD-777

Paper copy \$8.25
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(358) NUTRITION INTERVENTION: A TEST OF EXTRUDED FOODS IN BALWADY FEEDING PROGRAMS IN TAMIL NADU

Gopalaswamy, T. P.; Cantor, S. M., Associates Inc., Haverford, Pa.

1973, 70p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. D, pt. 3)

The acceptability of extrusion-cooked foods was tested during a three-month study in Tamil Nadu, India, in 1972, using a Wenger

X-25 extruder and twenty-two balwadies to reach 2,170 beneficiaries. These included 600 pregnant or lactating mothers, 700 infants aged six months to two and one-half years, and 870 children aged two and one-half to five years. The study objectives were to test the acceptability, shelf life, handling characteristics, packaging requirements, and operational advantages of extruded food preparations. Two formulations were selected: a bland bite-size bit in ready-to-eat form, and a sweetened powder intended to be reconstituted with water into a porridge. Both products were composed of 70 percent corn grits and 30 percent defatted soya flour, fortified with a vitamin and mineral premix. Both foods were found to be acceptable in the sense that they were not rejected by the test population. Daily consumption was not very different from consumption of CSM in the regular balwady program. However, the sweetened powder was less palatable, and after a time it was being prepared by cooking it in a traditional local preparation. The foods had excellent handling characteristics, the polyethylene packaging was adequate, and the shelf life appeared to be comparable to CSM. The short test program was promising. Further research is needed on operations, preparations, and costs before large-scale programs can soundly be based on extrusion technology.

PN-AAD-778

Paper copy \$6.55
Microfiche \$1.00

(359) A SURVEY OF FOOD PROCESSING INDUSTRY IN TAMIL NADU, INDIA

Kothari, K. B.; Thiagarajan, P. S.; Cantor, S. M., Associates Inc., Haverford, Pa.
1973, 289p.

Cantor (AID/nesa-399 GTS)

(In Tamil Nadu Nutrition Project, v. 2, Sect. E)

A detailed survey of the food processing industry in Tamil Nadu, India, was conducted as part of a systematic analysis of nutrition delivery systems. Objectives were to collect relevant data on food manufacturing plants, food processed, nutrient values of raw material inputs and product outputs, marketing methods, distribution practices, costs, and prices. A stratified sampling plan was used to select 1,000 of the more than 20,000 processing plants for inclusion in the survey, conducted from September to November, 1971. Much descriptive and statistical information is presented on the following industries: rice, flour, and dal mills; bakeries; dairies; sugar mills; edible oil mills; canning and preserving of fruits and vegetables; confectionaries; soft drinks and aerated water industry; sago industry; salt industry; tea curing industry; cashew industry; and industries concerned with other food products. An attempt to establish the amount of nutrients lost through processing was not successful, owing to lack of available data on the nutrient values of certain raw food materials.

PN-AAD-779

Paper copy \$24.75
Microfiche \$ 3.00

(360) FORTIFICATION OF SUGAR WITH VITAMIN A IN CENTRAL AMERICA AND PANAMA

Instituto de Nutricion de Centro America y Panama
1975, 37p.

PAHO (AID/ta-C-1225 GTS)

Nutrition surveys of low-income families in Panama and other Central American countries have shown that vitamin A deficiency is a serious problem. Thus, in 1969 a research program was begun to assess the feasibility of fortifying white sugar with vitamin A. The research demonstrated the feasibility of the fortification chemistry and technology. Fortification did not affect the taste and odor of the fortified sugar, nor the physical and chemical stability of vitamin A in the processed product. A

meeting of INCAP staff was held with officials of the government of Guatemala in August 1973, to discuss whether fortification is necessary, effective, efficient, and safe. The conclusions were: Under prevailing conditions in Guatemala, fortification is necessary. Fortification with vitamin A in the form of retinol palmitate is effective, and the expected ratio of costs to benefits is highly favorable in comparison with other massive public health programs. It costs about \$.03 per year per capita. Fortification of sugar does not pose any toxicity risk. The study group recommended that, at a minimum, the government initiate a program to supply fortified sugar to rural children aged one to nine at a level adjusted to daily intake recommended by FAO/WHO.

PN-AAD-739

Paper copy \$3.10
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(361) CURRENT PRACTICE AND FUTURE DIRECTIONS OF NUTRITION EDUCATION IN DEVELOPING COUNTRIES, A RESEARCH AND POLICY ASSESSMENT

Rasmuson, Mark
1977, 78p.

AED (AID/ta-BOA-1377 GTS)

Assesses the present state of nutrition education research and practice in developing countries and makes suggestions for future directions in the field. This report reviews recent efforts in research and action programs in nutrition education, noting developments that caused important changes to be made in the field in the early 1970's. The implications of these developments are discussed with a focus on trends in the purpose and scope of the field, specific themes and objectives, audiences, and methodologies. Recent policy statements and actions by major international agencies providing assistance to nutrition programs in LDCs are explored. The findings suggest that these statements and actions comprise a new type of policy which will guide international assistance in health and nutrition. Developments are researched which bear directly on the practice of nutrition education in related fields such as development communication, family planning, applied anthropology, and social marketing. Recommendations for future research and programming in the field concern: gathering comprehensive data in LDCs, continued testing of methodologies, cost-benefit studies, and basic research on behavior change.

PN-AAE-112

Paper copy \$7.25
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(362) COMMUNICATION AND EDUCATION IN NUTRITION PLANNING IN COSTA RICA

De Sagasti, H. E. E.; Hornik, R. C.
1975, 42p.

AED (AID/ta-BOA-1060 GTS)

Presents the results of a two-week team effort by two persons with experience in development communications to study how to use A.I.D. loan resources in Costa Rica for program activities in nutrition education and communications. The approach followed did not restrict the researchers to traditional ideas of nutrition education. They focused on the use of communication, information, and education in the national nutrition program. They considered the more efficient use of available food resources of the family and also the integrated support of the national plan. Specific objectives were in food production, improved food storage, selection and preparation of foods, consumption of available foods, and control of diseases related to

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Index of Issuing Offices at the rear.

AGRICULTURE AND NUTRITION

malabsorption of ingested foods. The final purpose of the nutrition education was to improve food intake and use. Conventional and mass communication techniques were employed as a broad approach to this issue. This document outlines the key areas for nutrition education and communication, the current state of nutrition education, and radio and audiovisual production; it gives suggestions for upgrading each. It also covers new communication strategies in nutrition, such as radio study group campaigns and maternity clinic education. A financial summary of proposed projects is presented, and the necessary loan funds are discussed.

PN-AAD-848

Paper copy \$4.25

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(363) USING MODERN MARKETING TECHNIQUES FOR NUTRITION EDUCATION, ECUADOR; FINAL REPORT

Manoff Int. Inc., Wash., D. C.
1975, 173p.

Manoff (AID-518-345-T GTS)

Describes the use of marketing techniques in nutrition planning, focusing on changing the food habits and personal hygiene behavior of rural people in Ecuador. A survey of nearly 2,800 respondents at the end of the two-and-a-half year project determined the changes in behavior, knowledge, and attitudes about health and nutrition following radio and television transmission of short messages on nutrition education. A descriptive analysis of the project setting forth a "reach and frequency" technique appropriate for other countries is presented, as are the processes of planning, executing, and evaluating such a project. A second section of the report describes the objectives of research in the project: (1) refining the design to make sure messages were meaningful and motivating, and (2) interpreting the impact of the campaign on target audiences. Results showed that such a technique can be used to reach rural mothers, farmers, and young people without a large financial investment. The appendices include the survey, questionnaire, plus code sheets and guides.

PN-AAD-859

Paper copy \$15.10

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(364) EFFICIENT RESOURCE USE FOR TROPICAL NUTRITION: NIGERIA

Smith, V. E.
1975, 395p.

Mich. State (CSD-2826 211d)

(In MSU int. business and economic studies)

Gives a method for organizing skills into a system to examine the efficiency of the agricultural sector in the production of nutrition. The capacity to provide adequate nutrition for the people of a country depends upon the resources available, the agricultural techniques in use, and the efficiency with which those resources are employed. For an efficient solution of the problems the goals of the nutritionist must be combined with the knowledge of the economist and the expert in agricultural development. This report describes a mathematical programming model of the nutritional supply problem in Nigeria during the 1960's. It uses this model to answer questions that are important in planning for improved nutrition for the poor. It concludes that the nutrients which are costly to produce in quantities that meet dietary allowances are riboflavin, calories, calcium, and Vitamin A. More nutritional benefit can be gained by expanding certain food crops than any of the income crops. Expansion of the animal industries offers relatively little benefit.

PN-AAD-425

Paper copy \$34.30

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(365) NICARAGUA: A STRATEGY FOR NUTRITIONAL INTERVENTIONS IN THE SMALL FARM SECTOR

Brown, Albert
1977, 50p.

ATAC (AID/afr-C-1142 GTS)

Malnutrition among poor families in Nicaragua is common in rural areas. The government is establishing a national food and nutrition program to deal with malnutrition. This report provides an analytic framework for selecting nutrition interventions in rural areas, and it describes a program based on that analysis. The rural area includes three overlapping subpopulations at risk: small farmers, non-farmers, and farm laborers. The major characteristics of small-farm families which affect their nutritional status are dependent on home-grown food, combined with limited purchasing power, seasonality of production, their dispersion and isolation, and strong traditions. They will be benefited by interventions which increase and diversify their production, and protect stored food against loss. With small-farm families, children up to age six and pregnant and lactating women are the most at risk, and they will need some form of supplemental food to escape malnutrition. Protein-calorie malnutrition and Vitamin B-complex deficiency can probably be overcome by an increase in gross intake of the grain-pulse diet common to the area. However, weaning children may not be able to consume enough bulk to obtain the needed calories. Vitamin A deficiency can be overcome by fortification of sugar, and iodine deficiency by fortification of salt. A national program is preferable to a regional program. Nutritional interventions in rural areas should include salt and sugar fortification, community granaries, nutrition education programs in the primary schools and on national radio, and supplemental feeding of high-risk groups.

PN-AAE-107

Paper copy \$4.90

Microfiche \$1.00

(366) CORN FORTIFICATION, A FIELD DEMONSTRATION MODEL; FINAL REPORT, 1971-1976

Instituto de Nutricion de Centro America y Panama
1976, 88p.

PAHO (CSD-3357 Res.)

A PROJECT: To determine the effect of corn fortification with protein, lysine, vitamins, and iron on nutrition of pregnant women, fetal growth, growth and development of children, disease incidence and intestinal infection by *Shigella*. The project was also to study the management and economics of corn fortification at the community level and to evolve operational guidelines and economic data applicable to a regional or national program.

DURATION: January 1, 1971 - March 31, 1976

DEVELOPMENT: Through the activities of this project it was shown that it is possible to fortify corn at the village mill level and that it is possible to maintain the collaboration of a significant group of population. The intervention was beneficial in reducing infant mortality by fifty percent. Morbidity during weaning was reduced by thirty-three percent. A positive tendency for better growth increments in children three to five years old was found. The dietary intake in pregnant women was improved, however, no change in fetal growth was found. The two sections of this report deal with the implementation of the field methodology and acceptability of the intervention and with the biologic effect of the fortified corn. It is suggested that the consistency of the mixture be changed to pelletized form and that it be added to corn at ten

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DEVELOPMENT ASSISTANCE

percent level to obtain eight percent of final concentration in the corn dough. Additional field studies to show the effect of improvement of cereals should consider to increase the level of fortification, to enforce the fortification, to study the effect on a larger sample, and to include laboratory methods to assess the level of the host defense mechanisms. The report contains numerous tables illustrating the data gathered.

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methodologies present a series of different types of evaluation designs. These designs explain how each avoids threats to validity and is adaptable to use in foreign assistance projects. The report summarizes arguments for the adoption by A.I.D. of more rigorous design and evaluation methods. Actual project designs demonstrate how quasi-experimental and experimental principles may be combined in a single design format.

PN-AAE-051

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DEVELOPMENT ASSISTANCE

(367) GUIDELINES FOR INSTITUTIONAL AND MANAGERIAL ANALYSIS IN SECTOR ASSESSMENTS FOR COUNTRY ASSISTANCE PROGRAMS

AID/TA/DA
1976, 26p.

AID/TA/DA

Sets forth a realistic, analytic basis for increasing managerial capability in designated LDC sector institutions. Guidelines apply to sector assessments in the areas of food and nutrition, health and family planning, education, and human resources development. The appraisal techniques recommended are four: (1) reconnaissance—an on-site survey to determine the scope and content of sector management appraisal and the types and timing of assistance required; (2) diagnosis—probing the managerial and administrative strengths and weaknesses of selected public and private agricultural institutions at multiple levels to identify major problems; (3) prescription—proposing various problem oriented responses/solutions to the key deficiencies; and (4) plan of action for possible A.I.D. assistance—an identification of possibilities for A.I.D. support, a summary of problems and proposed responses, together with an indication of priority and urgency and types of assistance for project design and analysis. To help determine the scope of appraisals, the document outlines sector delineations including sector functions, organizational jurisdictions, and major programs and projects. In addition, organizational and managerial elements are presented, such as leadership, manpower development, program management, and resource administration.

PN-AAD-680

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(368) THE APPLICATION OF QUASI-EXPERIMENTAL METHODOLOGIES TO THE DESIGN AND EVALUATION OF FOREIGN ASSISTANCE PROJECTS

Job, B. L.
1976, 104p.

MUCIA (CSD-2958 211d)

Summarizes investigations made by the Midwest Universities Consortium for International Activities (MUCIA) in 1974 and 1975 concerning the design, evaluation processes and procedures used by A.I.D. in foreign assistance projects. The study attempts to bridge the gap between the practitioner and the theoretician on quasi-experimental methods by presenting material which treats evaluation and the A.I.D. environment. Methodological discussions are cast within the context of foreign assistance evaluation and design situations. Evaluation, its types and purposes, and its role in the A.I.D. foreign assistance process is discussed, with special emphasis being placed on the importance of sound program and project design. It notes the pitfalls often encountered when social action programs are evaluated. Numerous detailed examples typical of foreign assistance project and program evaluations are cited. Quasi-experimental and experimental design concepts and

ECONOMICS

GENERAL

(369) FRAMEWORK FOR POLICY RESEARCH ON ECONOMIC DEVELOPMENT

AID/PPC/PDA
1977, 25p.

AID/PPC/PDA

Summarizes the statement on economic development prepared in January 1977, by the Policy Development and Analysis Staff of A.I.D. A framework for organizing policy oriented social science research and analysis efforts is provided in order to guide A.I.D. programs and policies. This framework is set forth for five sets of development objectives and the strategies for meeting them. The focus of these objectives is on increasing the supply of goods and services needed to improve the well-being of lower income families while, at the same time, assuring them of access to those goods and services. A participatory strategy is stressed to ensure that these objectives are met. Policies and strategies which would increase goods and services are those which increase agricultural production, and improve and enlarge health, nutrition, family planning, and educational services. This paper discusses income and employment strategies with regard to wage determination and income patterns, the role of women, agricultural employment, and export potentials. It examines the flow of capital resources and other aspects of the international environment in a participatory framework which is influenced by international trade performance. Special problems of implementing policy decisions which are reviewed are: political and social processes, participation and human rights, institutional dynamics, and monetary techniques. This study recommends three approaches which can be used to assess the progress in attaining the objectives of participatory growth: analysis of national budget and resource allocation information; analysis of large-scale sample survey data; and program and project assessment.

PN-AAE-043

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(370) THE ECONOMIC ROLE OF THE IVORIAN WOMEN

Montgomery, Barbara
1977, 52p.

Mich. (CSD 2547 211d)

(In Discussion paper no. 61)

Examines the role of the Ivorian woman in the modern sector of the economy of Ivory Coast. Ivorian women from most ethnic groups come from a long tradition of independent economic activity, but their number in the salaried labor force is small.

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Index of Issuing Offices at the rear.

ECONOMICS

These factors impede success of the Ivorian woman in modern business and government: (1) the problem of transition from traditional African Village culture to the life of a modern industrial society, and (2) the difficulty of reconciling biological and social demands of the family education of girls and of boys. This study analyzes the barriers which restrain the entry of women into the labor force. It explores the reasons for the success of the few women in the higher levels of business and government.

PN-AAD-388

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(371) THE DETERMINANTS OF INCOME AND ITS DISTRIBUTION IN FOUR VILLAGES IN INDIA

Lopez, Michael

1977, 78p.

Mich. (CSD-2547 211d)

(In Discussion paper no. 64)

Examines the distribution of income among households in India by explaining the determinants of the income of each household. A model is presented in which income is a function of the distribution and values of these assets. The article contains two major components: an analysis of the determination of each household's income and an analysis of the distribution of household incomes within the villages. Four villages were surveyed. The common characteristics of the villages were: (1) they were developing economically, (2) the irrigated area increased substantially in each of the villages, (3) all were the objects of government development programs, and (4) three of them were near enough to a city or town that some residents could commute to urban jobs. Simple linear regressions on variables representing land, labor, education, and milchstock account for 36% to 87% of the variance in household incomes per capita. The influence of caste is found to be primarily indirect. The role of economic factors varied greatly with occupation. In the second part of the paper, an original method, based on correction for the systematic accumulation of errors, refines the estimated income distribution obtained from the set of regression equation predictions for individual households. Inequality of land distribution is shown to be the only important factor in explaining income inequalities. The income distribution effects of a hypothetical land reform are simulated.

PN-AAD-391

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(372) A STOCHASTIC LEARNING MODEL OF MIGRATION

Cross, J. G.

1977, 19p.

Mich. (CSD-2547 211d)

(In Discussion paper no. 65)

This report uses a behavioristic approach to migration in which individuals' decisions are treated as random variables whose likelihoods are dependent upon each individual's previous experience and not on any kind of explicit expected income or utility calculations. This approach is in contrast to those migration theories which assume that workers take rational account of unemployment rates when they compare the income potentials of alternative locations and fail, irrationally, to act upon these comparisons. This model would employ many other variables. A migration theory is developed which relies upon a theory of learning and information transmission. This leads to the formulation of a migration model which is quite similar to the more intuitively based migration equations found in the current literature.

PN-AAD-392

Paper copy \$2.00

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(373) DEPENDENCE AS AN EXPLANATION OF UNDERDEVELOPMENT, A CRITIQUE

Weisskopf, T. E.

1977, 34p.

Mich. (CSD-2547 211d)

(Presented at 6th national meeting of the Latin American Studies Assn., Atlanta, 1976)

(In Discussion paper no. 66)

The concept of dependence is often used to characterize a relationship between one nation and another nation, but in this report the definition of dependence refers to economic relations only. It critically examines some of the major themes in the literature on dependency theory in order to clarify the relationship between dependence and underdevelopment. The purpose of the report is, first, to identify and state unambiguously certain propositions implicit in much of the dependency literature and, second, to subject these propositions to a critical analysis. The principal arguments evaluated are: (1) that dependence inhibits economic growth, (2) that dependence results in an undesirable pattern of economic development, and (3) that dependence leads to an unviable pattern of development. The author compares these arguments to alternative possible hypotheses in light of generally available evidence on the development of the world capitalist economy.

PN-AAD-393

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SMALL-SCALE INDUSTRIES

(374) INDUSTRY PROFILE SERIES: WOOD CHAIRS

Quintero, Socorro

1977, 17p.

Ga. IT (AID/CM/ta-G-73-18 211d)

(In Profile no. 2)

This profile presents a guide to the basic principle involved in the production of a simple, nonupholstered wooden chair. It provides entrepreneurs with a framework of basic information from which detailed feasibility studies can be developed for a proposed operation based upon costs and conditions for a specific location and market. There are three general sections: marketing information, technical information, and financial information. A plant layout for this operation and illustrations of the chair are also included. Cost figures for raw materials, equipment, and personnel were generally based on prices prevailing in Georgia, U.S.A., and would vary according to location. This profile should be considered only as a guide to the items to be considered and to the basic principles involved and cannot be directly applied to most LDCs without significant revisions.

PN-AAD-628

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(375) INDUSTRY PROFILE SERIES: WOOD DESKS AND CHAIRS

Quintero, Socorro

1977, 17p.

Ga. IT (AID/CM/ta-G-73-18 211d)

(In Profile no. 1)

This profile provides the entrepreneur with a framework of basic information for the production of simple desks and chairs. From this a detailed feasibility study can be developed for a proposed operation in a specific location and market. The market for wood desks and chairs is directly related to population growth, creation of new households, business and commercial activity, and

institutional expansion. There is also a substantial replacement market. The profile is arranged in three general sections: marketing, technical, and financial information. Included are: a description of the procedures and plant operation, a general process chart, plant layout, marketing information, tabular data on production requirements, personnel requirements, capital requirements, annual costs and sales revenue, and cash flow projection. Some data apply to prevailing conditions in Georgia, U.S.A., and cannot be directly applied to most of the LDCs without significant revisions. Assuming the same volume of production, an LDC enterprise would have a lower proportion of fixed capital requirements and a higher percentage of working capital requirements. This profile should be considered only as a guide to the items to be considered and to the basic principles involved.

PN-AAD-627

Paper copy \$2.00
Microfiche \$1.00

(376) INDUSTRY PROFILE SERIES: FRUIT AND VEGETABLE CANNING

Park, Choon-yup
1977, 17p.

Ga. IT (AID/CM/ta-G-73-18 211d)

(In Profile no. 3)

Since economic growth in the developing countries provides a favorable climate for the development of food processing industries, this profile gives basic information concerning the small-scale canning of fruits and vegetables. The raw materials selected were those available in Georgia, U.S.A., and neighboring states. Canned dried beans, snap beans, peaches, and tomatoes were used. The report includes a general process chart for each item, a plant layout, market potentials, production requirements, personnel requirements, capital requirements, annual costs and sales revenue, cash flow projections, and comments on cash flow. From this profile, a detailed feasibility study can be developed for a proposed operation in a specific location and market. The report is in four general sections: description of the products, plant, and operation; marketing; technical information; and financial information. Since the data apply to prevailing conditions in Georgia, U.S.A., the profile cannot be directly applied to most LDCs without revision, and it should be used only as a guide to the basic principles involved.

PN-AAD-629

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EDUCATION

GENERAL

(377) DESIGN FOR CHANGE: HIGHER EDUCATION IN THE SERVICE OF DEVELOPING COUNTRIES, A HANDBOOK FOR PLANNERS

Fogel, B. R.; Int. Council for Educational Development, N. Y. 1977, 80p.

AID/TA/EHR

(In Higher Education for Development (HED) Study. Higher education and social change, v.1: Reports, 239 p.: PN-AAD-619; v.2: Case studies, 587 p.: PN-AAD-620)

This handbook articulates and synthesizes the experience, opinions, and wisdom of people who have been directly involved in implementing programs of higher education in LDCs through the International Council for Educational Development (ICED). Sections in the handbook deal with the environment of change and the ways the reformer and the process of reform interact to

create new educational programs. Recommendations for the reformer and bibliographic notes are given at the end of each section. Case studies are included in all the sections. The section on freedom and restraint discusses sponsorship of the project and the need of the reformer for freedom of experimentation. The section on crisis and continuity discusses social stimuli and values. In the section on seed and soil the author examines the agents of change and their environment. "Performance and Audience" lists means for evaluating programs of higher education. A project checklist at the end of the handbook is a summary and restatement of the material; it is arranged according to specific project concerns. There are sections concerning planning, administration, staff, students, community, finance, evaluation, and dissemination. Appendix 1 is a questionnaire on innovation in higher education for development. Appendix 2 lists the staff of ICED by geographic location, along with their addresses.

PN-AAD-901

Paper copy \$7.40
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(378) HIGHER EDUCATION AND SOCIAL CHANGE; PROMISING EXPERIMENTS IN DEVELOPING COUNTRIES, V.1: REPORTS

Thompson, K. W.; Fogel, B. R.; Int. Council for Educational Development, N. Y. 1976, 239p.

AID/TA/EHR

(V.2, case studies, 587 p.: PN-AAD-620)

Discusses how higher education in developing countries can contribute more to social progress. Topics include educational problems of the developing country and the need for organization, leadership, assistance, and guidelines for development. Summaries of 23 case studies in Africa, Asia, and Latin America indicate the more successful institutions of higher learning in those countries. (These are detailed in Volume II). Problems which normally hinder development may be a lack of understanding of the historical and cultural processes in a country, unsolved problems regarding the transfer of technology, or a lack of knowledge about assisting weaker institutions and poorer countries. Emphasis is therefore placed on the importance of an institution's willingness and ability to look at its problems from a national rather than from a Western perspective. The findings of the study suggest that institutions of higher education are appropriately and successfully engaging in these services and extension programs: adult education, consultant centers, assistance to small and medium-sized landowners, health delivery in rural and urban areas, experimental farming, manpower training, land reform and human settlement, preparation of business technicians and middle managers, and primary and secondary education.

PN-AAD-619

Paper copy \$20.60
Microfiche \$ 3.00

(379) HIGHER EDUCATION AND SOCIAL CHANGE; PROMISING EXPERIMENTS IN DEVELOPING COUNTRIES, V.2: CASE STUDIES

Thompson, K. W.; Fogel, B. R.; Danner, H. E.; Int. Council for Educational Development, N. Y. 1976, 587p.

AID/TA/EHR

(V.1, reports, 239p.: PN-AAD-619)

The case studies undertaken in Africa, Asia, and Latin America

For addresses of issuing offices see the Index of Issuing Offices at the rear.

EDUCATION

and presented in this volume result from the combined efforts of educators from 40 developing countries and three members of the New York staff who coordinated this project. It provides a cross-section of higher education's approaches to problems of development. The publication includes studies of the responses by institutions of higher education to the problems of rural development, of the university's role in designing and implementing health care systems, and of the efforts of higher education to improve learning in the primary and secondary schools. It also includes studies of manpower training, of the special problems of establishing a university in a developing country, of higher education systems as a whole, and of research and extension for industrial development. Countries which participated in the study are Botswana, Lesotho, Swaziland, Cameroon, Ethiopia, Ghana, Mali, Mauritius, Nigeria, Sudan, Tanzania, India, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brazil, Colombia, Mexico, and Peru. (A final report on the project and the three overall reports of the regional teams appear in Volume 1).

PN-AAD-620

Paper copy \$50.20
Microfiche \$ 6.00

(380) A NOTE ON MEASURING EDUCATIONAL RETURNS IN LDCs

Monson, T. D.
1977, 14p.

Mich. (CSD-2547 211d)

(In Discussion paper no. 63)

Describes modifications to educational measurements and reports the results of a case study in the Ivory Coast. Estimates of returns to education in developing countries appear to be optimistically high when high failure rates and educational screening are not taken into account. When the standard internal rate of return (IRR) methodology is modified to incorporate these possibilities, estimated returns fall as much as 50% when applied to the Ivory Coast. The results suggest that (1) the modified methodology should be applied in other parts of the world with similar educational and labor market characteristics and (2) estimates not accounting for these factors most likely exaggerate true educational returns.

PN-AAD-390

Paper copy \$2.00
Microfiche \$1.00

(381) THE IMPACT SYSTEM FOR LOW-COST PRIMARY EDUCATION

Nichols, D. G.
1975, 61p.

AIR (AID-490-7 GTS)

(In AID-IMP-21200/75-FR)

A problem most developing countries face today is how to provide high-quality, low-cost educational programs. Project IMPACT (Instructional Management by Parents, Community, and Teachers) is an educational experiment being conducted in nine villages in Indonesia and the Philippines. Its purpose is to provide good primary education at a greatly less per-pupil cost. It uses several non-teacher learning methods, including self-instruction, peer-group learning, upgraded progression, skill training by volunteers in the community, and programmed teaching and tutoring by older students. What is new about the project is its management of the various components and their integra-

tion into a total learning system directed toward the achievement of stated objectives. The plan for IMPACT by 1978 is to have 26 school personnel serving a cluster of ten contiguous villages, each with 200-400 primary age students. Traditional staffing for a system with that many students would number 102 school personnel. IMPACT school facilities are called Community Learning Centers, partly to de-emphasize the idea of teacher-led school classes. On the grounds of each center are 30 to 40 thatch and bamboo structures, called "learning kioskos," built of local materials by parents. Beginners, in groups of six to eight, learn reading and math under the guidance of older primary students. Self-pacing is emphasized. Weekly contracts and incentive awards are used. Parents accept responsibility for their children's learning. Learning segments in IMPACT are called modules. They feature clearly stated objectives, instructions, short learning sequences, evaluation exercises, review, and posttests. The complete primary curriculum consists of some 1200 modules—200 per year, with approximately 35 each year in a given subject.

PN-AAD-540

Paper copy \$5.80
Microfiche \$1.00

(382) EDUCATIONAL OUTCOME MEASUREMENT IN DEVELOPING COUNTRIES

Kiros, F. G.; Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 197p.

Georgetown (AID/CM/ta-C-73-8 GTS)

Since developing nations need to evaluate their educational efforts so they can apply their resources to suitable programs for development, this volume discusses educational outcomes, the role of measurement, and types of measures. It is intended for ministers of finance, planning, and education. It provides a basis for evaluating the best ways to plan educational systems to stimulate national development. Chapters cover measures of student educational outcomes, measures of attitudes and attributes, teacher tests and grades, factors of student background that are beyond the control of the educational establishment, and the 20-nation study conducted by the International Association for the Evaluation of Educational Achievement. They also cover education as an agent of social and political change, non-formal education, measurement of work skills, economic outcomes of education, educational planning, using outcome measures in schools, and improving resource allocations. In discussing the role of education in social and political change, the authors point out that researchers have not fully explored how educational systems operate to influence social and political change.

PN-AAD-470

Paper copy \$17.10
Microfiche \$ 3.00

(383) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 1: TYPES OF OUTCOME MEASUREMENTS

Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 31p.

Georgetown (AID/CM/ta-C-73-8 GTS)

Volume 1 of a six volume set of seminar guidebooks is for use as a teaching aid in seminars which inform officials and educators about educational outcome measurements. These help government planners in developing countries to assess how well their educational systems are working. It focuses discussion on types of outcome measurements. Questions covered include: the kinds of individual and social competencies or outcomes being sought through education, the specific measures of educational outcome which may be used to measure the primary effects of education on the individual's learning, knowledge, aptitude, and skills, and

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

how outcome measurements differ from traditional input or process indicators that have guided educational policies in the past. Also examines what is sacrificed to devote more resources to education and to allocate more resources to one educational program rather than another, and what the yardsticks are for assessing criteria to measure outcomes. Notes relating to those and other questions are presented for the discussion leader, along with tables of educational outcomes and schematics of decision processes.

PN-AAD-471 (English, 31p.) Paper copy \$2.60
Microfiche \$1.00
PN-AAD-477 (Spanish, 39p.) Paper copy \$3.25
Microfiche \$1.00

(384) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 2: USES OF OUTCOME MEASUREMENTS

Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 34p.

Georgetown (AID/CM/ta-C-73-8 GTS)

Volume 2 of a six volume set of seminar guidebooks is for use as a teaching aid in seminars which help educational planners in developing countries to provide programs suited to their countries' needs by assessing present needs and programs. This guidebook for Seminar II focuses on the uses of outcome measurements. Questions presented, along with notes for the discussion leader, include the following: If there were perfect measures for individual and social competency, how should those measures be used in planning and implementing educational programs? Are the same outcome indicators useful for a variety of purposes? At what phases of policy analysis does outcome measurement become critical? Why is outcome measurement a critical component in Management by Objectives (MBO)? How may outcome measures be used in educational financing? What are the geographic levels of analysis and assessment? What are the project policy levels? Do multiple outcomes, when used in one of the ways outlined, overload the information for the policy official or administrator? Schematic figures are presented to illustrate the role of outcomes as components of policy analysis, the use of outcomes in evaluation, and the process of management by objectives.

PN-AAD-472 (English 34p.) Paper copy \$2.85
Microfiche \$1.00
PN-AAD-482 (Spanish, 45p.) Paper copy \$4.50
Microfiche \$1.00

(385) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 3: GENERATING OUTCOME MEASUREMENTS, ACHIEVEMENTS AND ATTITUDES

Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 33p.

Georgetown (AID/CM/ta-C-73-8 GTS)

This is Volume 3 of a six volume set of seminar guidebooks, which inform education policymakers how educational outcome measures can be used to assess educational needs and programs. It focuses on the topic of how to obtain information on educational achievements and attitudes as outcomes. Among the questions it presents and discusses are: What data are now available that could be used in measuring educational achievements and attitudes? What new data have to be collected? Are uniform tests useful for educational planning now being given? Are new instruments and methods needed? What has been the experience with test or survey formulation? What has been the experience with adapting existing testing instruments? In what ways does it seem feasible and equitable to use teachers' evaluations to assess

educational outcomes? Is there agreement with a measurement specialist who urges that self-esteem and external-internal controls are especially important noncognitive capacities to be developed through education? Or are attitudes about work—especially manual labor—a more significant outcome for developing countries? Figures presented in the guidebook include a schematic on steps in construction of tests and a table on relative characteristics of standardized tests and teacher evaluation.

PN-AAD-473 (English, 33p.) Paper copy \$2.75
Microfiche \$1.00
PN-AAD-478 (Spanish, 43p.) Paper copy \$3.60
Microfiche \$1.00

(386) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 4: GENERATING OUTCOME MEASUREMENTS, ECONOMIC AND SOCIETAL

Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 45p.

Georgetown (AID/CM/ta-C-73-8 GTS)

This is Volume 4 of a six-volume set of seminar guidebooks, which are for educational policymakers who want to use outcome measurements as a means of assessing educational objectives and programs. It covers how to obtain information on social returns from education. It examines the economic, social, political, and cultural payoffs from education. A set of educational outcomes relating to societal objectives of development is presented, followed by questions for discussion: Is the listing sufficiently comprehensive, and is it too vague to provide a basis for selecting criteria-output-oriented objectives or too lengthy to be meaningful for any one educational policy? Other discussion topics include these questions: What are the more effective approaches to gathering data on economic, social, and political outcomes? If modernity is an objective of an educational policy for development, how might this quality be tested for its impact on development? How might increased productivity be measured in rural areas or in selected city employments? Are there differences in earnings between those with specified types of education and those without a reasonable measure of productivity change and what do earnings comparisons by level of school provide as a guide to educational planning? Are approximate rates of return on education a factual basis for educational decisions? What is the relative share of educational resources spent in rural and urban areas? Several related schematics, tables, and graphs are presented.

PN-AAD-474 (English, 45p.) Paper copy \$4.50
Microfiche \$1.00
PN-AAD-479 (Spanish, 57p.) Paper copy \$5.50
Microfiche \$1.00

(387) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 5: APPLYING OUTCOME MEASUREMENTS

Glaser, Ezra
1975, 50p.

Georgetown (AID/CM/ta-C-73-8 GTS)

Volume 5 of a six volume set of seminar guidebooks, each of which focuses on an aspect of educational outcome measurement and uses of such measurements in order to assist educational policymakers in developing countries to assess their needs and programs, is on the topic of applying outcome measures. It

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EDUCATION

gives participants an understanding of the use of statistical science for the program administrator. The theme of the seminar is that there are great difficulties in collecting, analyzing, and interpreting data. Thus, formal statistical methodology is needed. Moreover, it is in program accountability and output programming that data interpretations are needed. A second theme of the seminar is that administrators can draw on other professions and combine input from two sources: education and statistical science. The guidebook discusses seven generic problems of acquiring, analyzing, and interpreting data for management uses. These concern characterizing and comparing a group of people, objects, or events; measuring the variability assignable to program influences; determining what principles govern collection of data for all types of analyses; and arranging for the economical collection of precise data. It also covers the application of statistical principles to out-put oriented management: to management by objectives, output budgeting, cost-effectiveness studies, and benefit-cost studies of educational programs.

PN-AAD-475 (English, 50p.)

Paper copy \$4.90

Microfiche \$1.00

PN-AAD-480 (Spanish, 61p.)

Paper copy \$5.80

Microfiche \$1.00

(388) A GUIDE TO EDUCATIONAL OUTCOME MEASUREMENTS AND THEIR USES; SEM. NO. 6: FEEDBACK CONSEQUENCES AND STEPS TOWARD IMPLEMENTATION

Mushkin, S. J.; Billings, B. B.; Georgetown Univ. Public Services Laboratory
1975, 28p.

Georgetown (AID/CM/ta-C-73-8 GTS)

Volume 6 of a six volume set of seminar guidebooks, which show education policymakers in developing countries how to use outcome measurement techniques in education, covers the topic of feedback consequences and steps toward implementation. Some discussion questions presented, with notes for the discussion leader, are: Can a list be made of ways in which outcome measurements have an impact on education? What teacher training activity can be undertaken to facilitate analysis and assessment of educational programs and projects? How are teachers using outcome measures to improve their teaching? What are the administrative uses of outcome measurements? What impact do outcome measures have on families and students? How are educational outcome measurements implemented? What agencies or units should be responsible for measurement? How can the necessary interagency cooperation be achieved? What processes of outcome measurement should be designed to facilitate access of nonformally educated persons to formal educational channels? The guidebook contains schematics or tabular figures on the following topics: interaction of correlates and educational outcomes; components of teacher training for use of outcome measurements; use of outcomes as a teaching aid; administrative use of outcome measurements; and steps in implementation of outcome measurement.

PN-AAD-476 (English, 28p.)

Paper copy \$2.35

Microfiche \$1.00

PN-AAD-481 (Spanish, 34p.)

Paper copy \$2.85

Microfiche \$1.00

NON-FORMAL EDUCATION

(389) ASSESSING NONFORMAL EDUCATION PROJECTS, AN INITIAL EXPLORATION

Levine, Victor; Moock, J. L.
1977, 43p.

ETS (AID/ta-C-1347 GTS)

This paper attempts to adapt cost-benefit procedures for direct

use by field practitioners. Cost/benefit techniques taught in university classrooms are not useful for those persons who conduct such analyses on project sites, especially in the area of assessing the costs and benefits of non-formal education (NFE). The paper consists of four parts. First, it considers characteristics of NFE most relevant to cost/benefit analysis. Second, it develops a simple conceptual framework for conducting economic analysis. Third, it examines problems of applications in terms of identifying types of information requirements, collecting data, defining the extent of data needs, and recognizing conflicting decision-making perspectives. Lastly, it integrates the preceding sections by use of an illustrative example of how a low-cost assessment procedure might be utilized. The paper presents a preliminary assessment procedure for NFE projects. The tentative design is logically consistent. The practicality of the proposed methodology can be determined only under actual field conditions, where structural and organizational constraints must be dealt with.

PN-AAD-550

Paper copy \$3.60

Microfiche \$1.00

(390) COST ANALYSIS IN NONFORMAL EDUCATION, A STATE OF THE ARTS PAPER

Lockheed, M. E.; Young, Kan-hua; Emery, J. C.; Summerskill, John
1977, 40p.

ETS (AID/ta-C-1347 GTS)

Reports on a project to improve methods for assessing the costs, cost/effectiveness, and cost/benefits of non-formal education (NFE) and to indicate what is known and not known in the field. With NFE programs gaining prominence in national and regional education schemes, governing bodies, planners, and administrators need to know more about the costs and results of such programs. This paper discusses major documents concerning the costs of non-formal education, including issues of estimating costs and issues of cost-effectiveness and cost-benefit analysis. Several types of costs need to be considered, including hidden, joint, capital, operating, fixed, and variable costs. Cost-effectiveness and cost-benefit analyses rely upon relating these costs to certain outputs. Cost-effectiveness analyses relate costs to quantifiable but non-monetary outcomes, while cost-benefit analyses relate costs to monetary outcomes. While it is evident how these linkages are made, it is not easy to make them in practice. Economists have relied heavily upon linear estimation models to make these linkages clear. Thus, while the elasticities of NFE can be estimated, the techniques necessary for such estimations are not readily available to the program director in the field. The purpose of further work in this project will be to overcome these problems by making the techniques for practical application more simple.

PN-AAD-549

Paper copy \$3.35

Microfiche \$1.00

(391) NON-FORMAL EDUCATION AND RURAL DEVELOPMENT

Axinn, G. H.; Axinn, N. W.; Goldenberg, Ted; Tusso, Hamdesa
1976, 61p.

Mich: State (AID/CM/ta-C-73-22 GTS)

(In Program of studies in non-formal education, supplementary paper no. 7)

This monograph, drawn from five working papers, notes several variables which are general characteristics of all social systems.

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Index of Issuing Offices at the rear.

A conceptual framework for analysis of rural development and non-formal education and the relationships between them is suggested. If education is to be effective among the rural poor it must be able to deal with human needs at the level of subsistence and survival. Non-formal education can speak directly to these needs in the areas of food, nutrition, health, and community welfare. It can also extend the benefits of formal education. The function of education within the rural social system is examined in this paper. Education approaches from outside the rural social system as an instrument for change within are analyzed. It concludes that non-formal education has a significant place in rural development, for it can bring the power of knowledge, facilitate communication, bring about shared awareness, and lead to political power.

PN-AAD-583

Paper copy \$5.80
Microfiche \$1.00

(392) A COST ANALYSIS OF A REGIONAL NON-FORMAL EDUCATION SYSTEM FOR SMALL FARMERS IN GUATEMALA

Norvell, D. G.; Straub, G. A.
1975, 14p.

AED (AID/CM/la-C-73-19 GTS)

Analyzes the costs of a regional non-formal education program for the small farmer in Guatemala. The program seeks to help the farmers increase their production. Preliminary data drawn from the experience of the basic village education (BVE) project in the Oriente region of southwest Guatemala are evaluated. This analysis forms a part of the study of the relative cost-effectiveness of the separate delivery systems in the BVE project and of their benefit-cost analysis. Cash costs and economic costs are examined in the context of each of three models. The delivery systems for the models are: radio broadcasting (Model 1), radio broadcasts combined with personal contact by monitors (Model 2), and radio programs combined with personal contact by monitors and agronomists (Model 3). In future studies, the models will be applied to regions with a population of 500,000 persons evenly distributed across the geographic area, and in which there are six to a family, with access to transportation. Seventy-five percent of the population will listen to the radio on the average of 2.5 hours per day. The analysis will span two years from planning and project design, installation of equipment, and start of operations to the end of the project. The basis for the benefit-cost analysis will be the cost data derived from the studies of Models 1, 2, and 3. The value of the increased production minus the costs of the increased inputs is the context within which the benefits will be analyzed.

PN-AAD-885

Paper copy \$2.00
Microfiche \$1.00

(393) NONFORMAL EDUCATION IN ECUADOR, 1971-1975: AN APPROACH TO NONFORMAL EDUCATION

Massachusetts Univ. Center for International Education
1975, 241p.

Mass. (AID/la-699 GTS)

Summarizes the impact of a three-year experiment with educational alternatives on rural areas throughout Ecuador. The project focused on experimentation with method during the first year, finding and testing delivery mechanisms in the second year, and consolidating experiences in the final year. Programmatic thrusts included the creation and testing of an approach to working with village facilitators and adapting materials and methods for use by the adult education staff of the Ministry of Education. The report includes a discussion of the conceptual framework of the projects, the use of the facilitator model, and the strategy of introducing ideas slowly and working with institutions only when

they are ready. Creating personal and social awareness among villagers, and the use of educational games are discussed along with the application of media to promote village participation and control over media use and content. Results of this report should be used with care since they are the product of limited, although in-depth, experiences in specific situations.

PN-AAD-626

Paper copy \$20.75
Microfiche \$3.00

(394) REPORT ON A CONFERENCE AND WORKSHOP ON NON-FORMAL EDUCATION AND THE RURAL POOR, MICH. STATE UNIV. EAST LANSING, 1976

Niehoff, R. O.; Neff, K. L.
1977, 260p.

Mich. State (AID/CM/ta-C-73-22 GTS)

Discusses the Second International Conference and Workshop on Non-Formal Education held at Michigan State University during September and October, 1976. The conference focused on the theme of non-formal education as a method of involving rural people in developmental processes designed to help them improve their economic and social well-being. The report selects case studies discussed in the conference which illustrate where the critical action is in non-formal education—where poor people struggle to survive. Chapter 1 discusses the background for the design of the Conference and Workshop. In Chapter 2 operational generalizations and issues synthesize major points made in the policy and program presentations. Chapter 3 presents the views of A.I.D. and the World Bank on non-formal education. Chapters 4, 5, and 6 present, examine, and evaluate case studies in Bangladesh, India, Colombia, Korea, Ecuador, Guatemala, and Botswana. The remaining three chapters deal with various topics presented at the panel discussions and workshops, such as using media systematically in non-formal education. The Appendices present an abbreviated program of the Conference, a list of materials exhibited, and a list of Conference participants; bio-data is given on the principal Conference resource persons.

PN-AAD-961

Paper copy \$22.35
Microfiche \$ 3.00

(395) NON-FORMAL EDUCATION FOR THE DEVELOPING WORLD; ANNUAL REPORT, 1976/1977

Mass. Univ. Center for International Education
1977, 54p.

Mass. (AID/ta-G-1112 211d)

A PROJECT: The purpose of the five-year non-formal education (NFE) grant of 1974 was to increase the capability of the University of Massachusetts to assist developing countries with collaborative NFE programs.

DATES: June 1974-June 1979

DEVELOPMENTS: This third year annual report describes the goals of the grant, accomplishments to date, impact of grant activities in meeting their purpose, other resources, and the use of institutional response capabilities in development programs. Project goals are being met in three areas: (1) through degree and non-degree programs for nationals of other countries who will serve in their own countries in NFE programs and for Americans who intend to work in international program areas; (2) through maintaining linkages with institutions interested in NFE and by expanding experimental NFE site programs; and (3) through research, evaluation, training and curriculum development and the dissemination of associated publications. This report in-

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EDUCATION

cludes a plan of work and a discussion of the involvement of minority personnel and women. "As a result of this grant, faculty, graduate students and associates of the University will be able to offer expertise in nonformal education theory and practice in the areas of training, research, materials development, and delivery system; and will maintain a network of human and material resources involving domestic, LDC and international institutions."

PN-AAD-600

Paper copy \$5.25

Microfiche \$1.00

EDUCATIONAL TECHNOLOGY

(396) COMMUNICATIONS TECHNOLOGY FOR DEVELOPMENT; GUIDELINES FOR CONSULTANTS WORKING WITH THE AGENCY FOR INTERNATIONAL DEVELOPMENT

Leavitt, H. B.; Boynton, P. L.
1976, 175p.

AED (AID/ta-BOA-1060 GTS)

This manual is for consultant teams in the area of communications technology preparing to provide technical assistance to A.I.D. missions and to the governments of LDCs. It provides an orientation to the kinds of work expected of such teams by A.I.D. in Washington and the local USAID Missions, as well as to the kinds of problems that may be met. It is also of use to consultants and A.I.D. officials interested in communications technology planning. In the manual, "communications technology" refers to the use of a wide range of media, including print, radio, TV, film, AV materials, etc., in an organized way to effect specified outcomes. These outcomes are usually the learning and application of knowledge. The guidelines in the manual present a general stock of ideas for planners from which appropriate materials can be selected for a specific need. They can be used flexibly to serve a variety of purposes: communications systems assessment, project identification studies, needs assessments, expansion of existing programs, or program implementation. The manual can be used as a source of information on A.I.D. procedures and documentation to ease communication between consultants and A.I.D. personnel. The 16 appendices contain specific information, and they are keyed into the text of the seven chapters. The manual is based on two A.I.D. policies: (1) Priority must be given to programs which help narrow the income gap between the rich and the poor. (2) A.I.D. should encourage the planning and use of communications technology to extend learning resources to more people than could otherwise be reached.

PN-AAE-490

Paper copy \$15.30

Microfiche \$ 2.00

(397) INTERNATIONAL EDUCATIONAL TECHNOLOGY NETWORKS, CONCLUSIONS AND RECOMMENDATIONS FROM THE FEASIBILITY STUDY

Leavitt, H. B.; Schenckan, R. F.
1975, 34p.

AED (AID/ta-BOA-1060 GTS)

The responses of media managers from 12 countries (Brazil, Columbia, El Salvador, Guatemala, Korea, Thailand, Pakistan, Iran, Egypt, Tanzania, Kenya and Ethiopia) are summarized in this report. Based on interviews with these managers, observations included here discuss the characteristics of managers of instructional radio and TV projects, their needs and information sources, their criticisms of past of existing networks, and the problems which they think might be solved through such an international endeavor. Major conclusions cited are an endorsement by network managers for such a network plan — if it would be problem oriented, offer a network office to facilitate communication, and initially have outside funding. The prime

focus is that LDCs can provide each other with assistance in educational technology that would help resolve the social problems in their countries. Specific findings are presented in two reports, PN-AAD-542 and PN-AAD-543.

PN-AAD-544

Paper copy \$2.85

Microfiche \$1.00

(398) ASIAN, MIDDLE EASTERN, AND AFRICAN REACTIONS TO THE FEASIBILITY OF INTERNATIONAL EDUCATIONAL TECHNOLOGY NETWORKS

Leavitt, H. B.; Schenckan, R. F.
1975, 30p.

AED (AID/ta-BOA-1060 GTS)

Media administrators in Korea, Thailand, Pakistan, Iran, Egypt, Tansania, Kenya, and Ethiopia were interviewed for their views on a plan to set up international educational technology networks. Such networks would encourage a free exchange of program-oriented information and experiences and technical assistance between countries using educational technology to resolve social problems. The information exchange would focus on the development of educational technology from other LDCs instead of relying exclusively on assistance from developed nations. This report includes the reactions of Asian and African network managers to the network idea, the problems that might be resolved through such international cooperation, and their specific informational needs. Major conclusions and recommendations from this feasibility study are included in PN-AAD-544.

PN-AAD-542

Paper copy \$2.50

Microfiche \$1.00

(399) LATIN AMERICAN REACTIONS TO THE FEASIBILITY OF INTERNATIONAL TECHNOLOGY NETWORKS

Leavitt, H. B.; Schenckan, R. F.
1975, 26p.

AED (AID/ta-BOA-1060 GTS)

Visits to Brazil, Columbia, El Salvador, and Guatemala solicited reaction from directors of instructional radio and TV projects to a plan for establishing international educational technology networks. The purpose of such networks would be to encourage a free exchange of program-oriented information and experiences and technical assistance between countries using educational technology to resolve social problems. The information exchange would focus on the development of educational technology from other LDCs instead of relying exclusively on assistance from developed nations. This report includes the reactions of Latin American media administrators to the network idea, the problems that might be resolved through such international cooperation, and their specific informational needs. Major conclusions and recommendations from this study are included in PN-AAD-544.

PN-AAD-543

Paper copy \$2.15

Microfiche \$1.00

(400) EVALUATION OF TWO-WAY TELECOMMUNICATION SYSTEMS FOR INTERACTION BETWEEN PROFESSIONALS FOR DELIVERY OF SOCIAL SERVICES TO RURAL POPULATIONS; FINAL REPORT

Practical Concepts, Inc., Wash., D. C.
1975, 201.

PCI (AID/otr-C-1377 GTS)

(Executive summary, 38p.: PN-AAD-872)

Presents a cost effectiveness analysis of the use of telecommunications to provide social services to the rural poor, compared

with more conventional means. Finds that in every instance reviewed, rural and urban, telecommunications-mediated services (radio-type) were equally or considerably more cost effective than conventional delivery systems. The study also provides a way to identify the cost effective factors that point to the use of telecommunications. It assists planners in selecting the most effective and least costly alternative applicable to the planner's own situation. The cost analysis of ten selected projects is included. One section of the report combines parts of successful experiences into optimum models of social service delivery systems for education and health. These can be used in several situations. The most effective programs involve professional-professional and professional-paraprofessional interactions. The study provides a bibliography and a summary of select documents describing the most successful programs.

PN-AAD-873

Paper copy \$17.45
Microfiche \$ 3.00

(401) EDUCATIONAL TECHNOLOGY AND THE DEVELOPING COUNTRIES, A HANDBOOK

Academy for Educational Development
1972, 185p.

AED (CSD-2506 GTS)

(In English and French)

This handbook presents ideas about educational development, technology, change, and the improvement of learning in developing countries in a descriptive fashion. It covers theory, planning, and case studies. The handbook presents ideas about educational improvement and change that could help to solve educational problems that are critical everywhere. All countries are confronted by a crisis in education, and the facets of education where problems are felt are enrollment, costs, teachers, management, curricula and teaching methods. This handbook shows that technological innovation can have a beneficial impact on education. It examines the basic steps in planning an educational technology system and the components of educational technology. It covers what technology is being used, and technology's promise and limitations. Case studies are presented from El Salvador, Niger, American Samoa, Mexico, Colombia, and Singapore. It also includes sources for further information on existing projects; on international and regional organizations equipped to give advice, materials, and aid; and on selected sources of equipment and programs. An extensive bibliography is included.

PN-AAD-562 (English, 185p.)

Paper copy \$16.10
Microfiche \$ 2.00

PN-AAD-563 (French, 243p.)

Paper copy \$20.95
Microfiche \$ 3.00

(402) INSTRUCTIONAL TECHNOLOGY IN DEVELOPING COUNTRIES: DECISION-MAKING PROCESSES IN EDUCATION

Wells, Stuart
1976, 190p.

Calif.—Berkeley (AID/CM/ta-G-73-17 211d)

(In Praeger special studies in int. economics and development)

Discusses instructional technology as a potential solution for the educational gap which exists between urban and rural areas of developing countries. The paper examines the problems of teacher participation, costs, and governmental and/or commercial control of technical media. It points out that instructional technology is only one educational alternative, and that the quality of instruction must be high. However, choosing such technology has the advantage of giving good quality teaching to educationally deprived areas. The analysis considers the difference between formal and non-formal education, the influence of

foreign agencies, and the tendency of the educational system to ignore the special needs of rural areas. Analytic processes discussed in the report include planning, problem analysis, choice of alternate solutions, implementation of the alternative, and monitoring the chosen system. Organizational charts are used to describe potential change impact. Cognitive and non-cognitive criteria, as well as the potential cost of instructional technology systems, are presented.

PN-AAD-624

Paper copy \$16.55
Microfiche \$ 2.00

(403) EFFECTIVE COMMUNICATION WITH THE RURAL POOR, EXECUTIVE SUMMARY

De Sagasti, H. E. E.
1975, 38p.

AED (AID/ta-BOA-1060 GTS)

(V. 1, a knowledge base for action, 176p.: PN-AAD-649; v. 2, an action approach, 134p.: PN-AAD-650)

This summary examines the conditions under which communications technology and methodology would be effective in producing changes in rural health and agricultural practices in less developed countries. In this study, 123 persons from international agencies and university communities were interviewed, and it is concluded that planning an effective communication component is necessary for development projects to affect the practices of poorer sectors of rural populations. The greatest problem in rural development has been the lack of active participation by local people; development projects most likely to affect the health or agricultural practices of the rural poor are local, flexible, action-oriented, and participatory, and they are based on an understanding of local culture. Strategies and approaches for effective use of communication technologies are discussed as they relate to key areas for assistance or support to developing countries. These are: the development of human resources, institution building, research, and developing a system for storing and retrieving information about rural development directed communications. The detailed studies are presented in Volume I; "A Knowledge Base for Action", and Volume II: "An Action Focus." These publications are useful for rural development planners in health, education, and agriculture.

PN-AAD-622

Paper Copy \$3.15
Microfiche \$1.00

(404) EFFECTIVE COMMUNICATION WITH THE RURAL POOR, V. 1: A KNOWLEDGE BASE FOR ACTION

De Sagasti, H. E. E.
1975, 176p.

AED (AID/ta-BOA-1060 GTS)

(Executive summary, 38p.: PN-AAD-622; v. 2, an action approach, 134p.: PN-AAD-650)

The issue of communicating effectively with the rural poor of developing countries to modify their health and agricultural practices is treated in a practical manner. Over 100 persons from international agencies and university communities were interviewed during the study, and a number of projects in LDCs were visited to seek out questions and problems related to planning, implementing, and evaluating the communication component of rural development programs. Other research and projects were studied in an attempt to answer the questions of LDC project planners according to the field experiences of several behavioral

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EDUCATION

scientists. The answers to eight major questions, presented in detail in this document, provide a knowledge base for communication methodology and technology in the context of rural development. (Volume 2 gives approaches and strategies for policy makers.) The questions focus on the various factors influencing the effectiveness of the use of mass media, its long-range effect on modifying health or agricultural practices, and other ways of bringing about change in those practices among the rural population. The Appendix includes the key questions asked by planners and explanations of the different approaches and contributions offered by several of the behavioral sciences.

PN-AAD-649

Paper copy \$15.35
Microfiche \$ 2.00

(405) EFFECTIVE COMMUNICATION WITH THE RURAL POOR, V. 2: AN ACTION APPROACH

De Sagasti, H. E. E.
1975, 134p.

AED (AID/ta-BOA-1060 GTS)

(Executive summary, 38p.: PN-AAD-622; v. 1, a knowledge base for action, 176p.: PN-AAD-649)

Approaches, guidelines, strategies and policy recommendations for planners in communications development are outlined in this volume, the third in the series. It points out that planning integrated communication components is needed for rural development projects to be effective, and that the greatest problem in the past has been the lack of active participation by local people. At the same time, it proposes that the most effective approach is local, flexible, action-oriented, and participatory, based on an understanding of local people and their behavior. The creation of strategies and approaches to implementation of communication projects must consider the compromise between the need for quick results and the time needed for preparation; for flexible planning of communication; for the participation of local people; for the use of feedback; and for a consideration of the potential of innovative uses of communication media. Recommendations include: training rural people as both national and regional specialists, and developing regional information and communication centers and national health centers.

PN-AAD-650

Paper copy \$11.90
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(406) THE EFFECTIVENESS OF ALTERNATIVE INSTRUCTIONAL MEDIA, A SURVEY

Jamison, D. T.; Suppes, Patrick; Wells, Stuart
1973, 98p.

Stanford (CSD-3284 Res.)

In this literature review, the effectiveness of five types of alternative instructional media are discussed: traditional classroom instruction (TI), instructional radio (IR), instructional television (ITV), programmed instruction (PI), and computer-assisted instruction (CAI). The survey suggests that alternative methods of TI are almost equally effective, although several of the studies reviewed indicate that different variables are significantly correlated with student achievement, e. g. the teacher's verbal ability and class size. The few studies on IR indicate that, supplemented with printed material, it is about as effective as TI. Research on ITV indicates that it is as effective, on the average, for all grade levels and subject matters. (There is little evidence on the effectiveness of ITV used in ways that exploit the unique capabilities of the medium.) Both PI and CAI attempt to improve the quality of teaching by providing individual instruction, nonetheless, findings of no significant difference dominate the research literature in this area. When small amounts of CAI are used to supplement regular class instruction, substantial evidence suggests that it improves achievement, particularly for slower students. Costs

of alternative technologies should be given serious consideration in planning or evaluating educational programs. In addition to the cost criterion, these considerations must be made: (1) the long-term significance of the savings in time exhibited in some studies using PI or CAI; (2) the impact of the technologies on the long-term motivation of students, (3) long-term effects of individualization and privacy (characteristic of some of the technologies; and (4) the impact of more imaginative uses of the media.

PN-AAD-829

Paper copy \$8.90
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(407) EDUCATIONAL TECHNOLOGY NETWORKS IN DEVELOPING COUNTRIES; A STRATEGY FOR IMPROVING THE DERIVATION AND UTILIZATION OF KNOWLEDGE, FINAL REPORT

Leavitt, H. B.; Acad. for Educational Development
1975, 88p.

AED (AID/ta-BOA-1060 GTS)

Instructional television (ITV) and radio delivery systems in LDCs are increasingly being used to solve problems of human resource development in remote areas. Because administrators of such systems make decisions which potentially use the full range of both hardware and software of educational technology, networks operating around these administrators have great potential. This report identifies five areas for networking: radio in rural development; radio in formal education; ITV in total systems; ITV or radio in teacher education; and educational use of satellites. The report proposes that for each area, five to fifteen outstanding national programs be selected from LDCs and their top administrators be invited to join a network of international peers. Network functions would include facilitating communications between network units, coordinating the implementation of cooperative problem-solving studies, convening an annual network workshop, and providing technical assistance of an informational and short-term nature. The information from the projects and the network studies would provide data that could be used by an information analysis center. According to this proposal, such a center would analyze data and extract guidelines on the use of educational technology. Creating educational technology networks consists of two steps: (1) planning a conference for administrators of ITV and radio projects in LDCs, which involves identifying candidates and visiting projects to determine the information needs of administrators; and (2) creating networks and developing network linkages and problem-solving activities.

PN-AAD-850

Paper copy \$8.05
Microfiche \$1.00

(408) ISSUES IN SATELLITE UTILIZATION FOR EDUCATION

Barkenbus, J. N.
1973, 30p.

AID/TA/EHR

Discusses the relevance of U.S. satellite projects in Alaska and in the Rocky Mountain and Appalachian regions to LDC use of satellites, focusing on the information they might provide for projected experiments in developing countries. Proposes that project planners from Brazil and India should examine the American projects which are reviewed here in preparation for their own educational satellite programs. Information required

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by such planners includes: the long-term feasibility of a project; the degree of cooperative effort required among various governmental levels as well as among private concerns; and the methodology and application of formative evaluation. Planners should understand that satellite use for educational purposes is an experimental venture with no back-up system. This report suggests that the distribution of evaluative and research reports from U.S. projects would provide an information base for rational decision making by LDC planners. Organization of a conference is also proposed to enable LDC policy makers to question the officials closely associated with U.S. educational satellite programs.

PN-AAD-860

Paper copy \$2.50
Microfiche \$1.00

(409) THE USE OF SATELLITES FOR TELECOMMUNICATION SYSTEMS IN EDUCATION AND NATIONAL DEVELOPMENT, CONFERENCE SUMMARY

Ingle, H. T.; Int. Working-Level Conf. on the Use of Satellites for Telecommunication Systems, Denver, Colo., 1974; AID/TA/EHR 1974, 26p.

AED (AID/ta-C-1056 GTS)

Demonstrations and feasibility studies using the satellite and ground telecommunications for socio-welfare services were presented during a 1974 working conference held at two American sites — a production facility in Denver, Colorado, and at one of the project's receiving sites in Heber City, Utah. Geographic areas represented were Africa, Colombia, Venezuela, Brazil, Canada, Egypt, India, Indonesia, Iran, New Zealand and the Pan Pacific, as well as Hawaii, Alaska, and the Appalachian and Rocky Mountain regions of the United States. The conference emphasized methods for the management of educational technology projects, the development of software, provisions for field utilization support and personnel training, and the identification of research and evaluation approaches. No attempt was made to provide a general model for the use of satellite telecommunications in education. The conference established an information network among 52 individuals from 11 countries.

PN-AAD-865

Paper copy \$2.15
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(410) A CASE STUDY OF THE ATS-6 HEALTH, EDUCATION AND TELECOMMUNICATIONS PROJECTS

Cowlan, B. S.; Foote, Dennis 1975, 116p.

AID/TA/EHR

(In A.I.D. studies in educational technology)

Satellite broadcasting can link remote and rural areas together quickly and economically. This report describes what was learned from experiments done by the U.S. on the delivery of education and health care by satellite. It is for planners and policy-makers concerned with educational and social issues. It focuses on issues of organization, production, and administration of educational and social services projects involving satellites. NASA's Applied Technology Satellite-Six (ATS-6) was used for six health and education experiments in rural areas of the United States. The experiments involved: formal in-school education in grammar school, junior high school and college settings; continuing professional education; medical consultations and health care delivery support; administrative interactions; and non-formal education. A wide variety of the issues raised during these experiments is discussed. Some of the more important observations are in the following areas: hardware, field support, management, and software. There is also a discussion of general issues and considerations for the future, of systems using both space and terrestrial communication links, and of other technological cost issues.

PN-AAD-584

Paper copy \$10.40
Microfiche \$ 2.00

(411) EDUCATIONAL REFORM WITH TELEVISION, THE EL SALVADOR EXPERIENCE

Mayo, J. K.; Hornik, R. C.; McAnany, E. G. 1976, 215p.

Stanford (AID/ta-G-1053 211d)

Covers the planning, development, operation, results, and problems of a unique experiment in instructional television in El Salvador. Unlike other developing countries which have attempted to upgrade various aspects of their educational systems with television, El Salvador used the medium as an integral part of its national educational reform which included curriculum revision, teacher training, and new concepts of supervision and pupil evaluation. By 1972, four years after El Salvador's educational reform began, notable accomplishments were obvious: more students were enrolled, there was better learning, and there were equal or lower costs per student. Drawing upon data gathered and interpreted over a five-year period, this report demonstrates how El Salvador achieved such results where other countries failed. A unified program of reform and a strong, capable administrator are shown to be crucial. The publication concludes with a critical examination of television's role in educational reform and with an analysis of how the El Salvador experience can be applied to other developing countries.

PN-AAD-857

Paper copy \$18.60
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(412) EVALUATION UNIT OF EDUCATIONAL TELEVISION PROGRAM, REPUBLIC OF IVORY COAST; FINAL REPORT

Academy for Educational Development 1974, 25p.

AED (AID/afr-828 GTS)

An international evaluation unit was attached to the educational television (ETV) program in Ivory Coast to analyze its problems and to provide its decisionmakers with information to facilitate more effective achievement to the program's goals. This report gives a brief description of the ETV program and of the unit's work in primary and out-of-school education sectors where the evaluation dealt with pedagogical, economic, technical, and managerial concerns. Indications of expected changes resulting from the evaluation are outlined. Goals of the country's ETV program are: (1) more equitable distribution of educational facilities throughout the country, (2) a link between educational expansion and regional development plans, thus creating job opportunities in rural areas for graduates from the system, and (3) improved teaching and learning efficiency of the system to reduce unit costs. The unit's evaluative data on this program are described as they might apply to similar programs in other countries.

PN-AAD-858

Paper copy \$2.00
Microfiche \$1.00

(413) THE COST OF INSTRUCTIONAL RADIO AND TELEVISION FOR DEVELOPING COUNTRIES

Jamison, D. T.; Klees, S. J. 1973, 103p.

Stanford (CSD-3284 Res.)

Describes a consistent methodology to evaluate the costs of

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EDUCATION

instructional radio and television, and it applies that methodology to numerous project analyses. Annualized costs for five instructional television and three instructional radio projects were obtained, and general cost equations were developed for planning educational technology projects. These equations were then applied to evaluate the costs of sample television and radio projects. Conclusions are: It is realistic to expect the costs of instructional TV to range from 1.5¢ to 15¢ per student hour, depending on the number of students in the system. The low end of this range can only be reached if close to a million students are using the system in a reasonably small geographic area. It is realistic to expect the costs of instructional radio to range from 1/3¢ to 3¢ or 4¢ per student per hour, about 1/5 as much as instructional television. The high end of this range can be reached with very small numbers of students (several thousand); the low end might require several hundred thousand. The high costs of technology projects result in a requirement that projects should last from 10 to 20 years to allow unit costs to fall to a reasonable level; if there is a great probability that a project will not last 15 years, its initiation should be reconsidered. Only the cost side of a cost-effectiveness analysis of the role of instructional TV and radio in LDCs is examined here.

PN-AAD-826

Paper copy \$9.30
Microfiche \$2.00

(414) RADIO'S ROLE IN DEVELOPMENT; FIVE STRATEGIES OF USE

McAnany, E. G.
1973, 31p.

AED (AID/ta-C-1056 GTS)

(In Info. bul. no. 4)

Since educators in developing countries need up-to-date information on the use of technology for improving education, this bulletin presents research on the uses of radio as an educational medium in developing countries. It discusses five use strategies: open broadcasting, instructional radio, radio rural forums, radio schools, and radio and animation. Presents the following findings and recommendations: (1) Efforts to use radio for rural development have been fragmented. (2) Radio is reaching only a minute fraction of its potential audience. (3) Little evidence is available concerning the effectiveness of present projects. (4) Radio strategies need institutional support. (5) Most existing projects are poorly planned and lack administrative support. (6) Better efforts should be made to establish the costs of various radio strategies. (7) New projects should be carefully planned, be tied to a multiple-media approach, and use trained monitors and field supervisors. (8) New projects should evoke as much local participation as possible. (9) The projects should be conducted in areas of a country that show signs of increased awareness. (10) More research should be conducted on radio strategies. (11) Training of technical people should emphasize simple, basic skills that rural people can easily acquire. (12) Finally, new projects should examine possibilities for coordinating locally controlled projects with large-scale uses of technology.

PN-AAD-453

Paper copy \$2.60
Microfiche \$1.00

(415) RADIO FORUMS, A STRATEGY FOR DEVELOPMENT

Rogers, E. M.; Braun, J. R.; Vermilion, M. A.
1975, 28p.

Stanford (AID/ta-G-1053 211d)

Discusses the role of mass communications and interpersonal communications in rural development in order to understand the operation of radio forum systems and to suggest better ways to use mass media for development. The function, purpose, and

basic elements of radio forums are defined. The basic assumption of mass media forum systems is that multi-channel communication is more effective than single-channel communication in reaching an audience with less cost. Findings indicate that radio forums have a significant impact on increasing the knowledge of illiterates. The report traces the development of radio forums in India in which 40 villagers took part, the Ghana radio forums project, and radio forum experiments in Ecuador, Brazil, Nigeria, and Tanzania. It gives 19 guidelines on the use of radio forums in the rural development of LDCs. These include: (1) the forums' effectiveness in using local content in messages and the importance of a small number of high-priority topics; (2) the need for forums to be aware of villagers' needs, vocabulary, comprehensive, and concept formation; and (3) the functions of feedback for program producers on the usefulness of messages, the style of presentation, and the logistic limitations. It also discusses the importance of the size of the forum, the trained leadership, and the caution that must be exercised in motivating audiences.

PN-AAD-856

Paper copy \$2.35
Microfiche \$1.00

(416) THE NICARAGUA RADIO MATHEMATICS PROJECTS

Searle, Barbara; Suppes, Patrick; Friend, Jamesine
1975, 67p.

Stanford (AID/CM/ta-C-73-40 Res.)

Research was carried out on the teaching of primary mathematics by radio in one population center in Nicaragua. The project site was about 30 kilometers southeast of Managua; favorable factors included its proximity to Managua, the presence of a compact and relatively large population in and around the town of Masaya, and an energetic school inspector who welcomed change and who took an active role in its promotion. The operation of the project, its objectives, and the school setting are here described; the curriculum structure, the radio lessons used, and the research and testing aspects of the project are also given. The research aims of the experiment are related to educational achievement, to the economics of radio as a technology of instruction, and to the applicability of the results to other settings. When this report was written, teachers were responding well to the program, and great care had been taken to assure that the children experienced success in their first exposure to radio lessons. Experience to that point confirmed the belief that it is possible and practical to produce attractive radio lessons in primary school mathematics.

PN-AAD-833

Paper copy \$6.30
Microfiche \$1.00

(417) SITE SELECTION PROCESS; RADIO MATHEMATICS PROJECT

Searle, Barbara
1974, 202p.

Stanford (AID/CM/ta-C-73-40 Res.)

Describes a process which was used to select developing countries in which research could be done on teaching primary school mathematics by radio. Teams visited South Vietnam, Thailand, Indonesia, the Philippines, Panama, Colombia, Ecuador, Peru, Nicaragua, Brazil, Swaziland, and Nigeria. As well as describing the criteria for country selection, this summary assesses the relative importance of criteria in making the final site selection,

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compares the characteristics of the countries visited, and makes recommendations. Includes a discussion of potential sites, country interest in the project, site identification, and the need for technical assistance. The information is supplemented by a matrix displaying the comparative characteristics of each country, by comparative demographic and education data, and by reports.

PN-AAD-621 Paper copy \$17.55
Microfiche \$ 3.00

**(418) APPLICATION OF RADIO TO TEACHING
ELEMENTARY MATHEMATICS IN A DEVELOPING
COUNTRY; ANNUAL REPORT, 1976/1977**

Stanford Univ. Inst. for Mathematical Studies in the Social Sciences
1977, 130p.

Stanford (AID/CM/ta-C-73-40 Res.)

A PROJECT: To use radio to teach elementary mathematics in Nicaragua. Conducting the project is the Institute for Mathematical Studies in the Social Sciences at Stanford University in collaboration with the Government of Nicaragua.

DURATION: June 1974 through June 1979

DEVELOPMENTS: Summarizing the project from July 1, 1976 to June 30, 1977, the report includes a project calendar which lists the dates that define the program. The teaching in grades one and two during the 1976 operations year is examined.

The study analyzes these facets of the program; operations in the schools, the instructional program, observations of student participation and interest, measurement of student achievement, and assessment of teacher attitudes. Tables present data derived from tests designed to evaluate these areas. The report provides plans of implementing the program at the third grade level in 1977. In February 1977 the project was awarded the 11th Japan prize for educational radio programs; this award and its effects are discussed. Other areas of the program which are summarized are: the collection and analysis of the school and demographic data; an analysis of addition and subtraction skills; computer generation of arithmetic exercises; a cost analysis; and an analysis of weekly test data. The study also examines these aspects of the project — project administration, the work plan of 1977-78, the dissemination and use of research results, and the involvement of women and minority personnel.

PN-AAE-041 Paper copy \$11.55
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PN-AAC-096 (1973/1974, 98p.) Paper copy \$ 8.90
Microfiche \$ 1.00

**(419) PROGRAM IN COMMUNICATION AND
DEVELOPMENT; ANNUAL REPORT, 1975/1976**

Stanford Univ. Inst. for Communication Research
1976, 93p.

Stanford (AID/ta-G-1053 211d)

A PROJECT: The purpose of this project is to strengthen, mobilize, and focus an institutional response capability at Stanford University dealing with low cost use of communication technologies designed to help satisfy the information needs related to the quality of life of the majority of people in developing nations.

DATES: Sept. 1973-August 1978

DEVELOPMENTS: A progress report is given for the two major field projects in the Ivory Coast and Guatemala. There is

an increased capacity to do research and extend the knowledge base in the use of media in out of school education and rural development information systems, in evaluation and methodology, in synthesis of knowledge concerning media use in formal schools, and in telecommunications policy planning. There is increased capacity to participate with developing countries in problem identification and analysis, program/project design, project operation, evaluation, and collection and dissemination of information. Papers published in connection with this project are listed. The work plan for 1976-77, the fourth year of the grant, is summarized within the four broad grant objectives: capacity for training, research, consultation, and linkages. Targets are specified as accurately as possible and estimates of outputs are described.

PN-AAD-594 Paper copy \$8.45
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Other titles in this series are:

PN-AAD-593 (1974/1975, 77p.) Paper copy \$7.15
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PN-AAC-090 (1973/1974, 82p.) Paper copy \$7.55
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HEALTH

GENERAL

**(420) ISSUES IN THE ALLOCATION OF RESOURCES IN
THE HEALTH SECTOR OF DEVELOPING COUNTRIES**

Heller, P. S.
1977, 40p.

Mich. (CSD-2547 211d)

(In Discussion paper no. 67)

Through an analysis of Tunisia's medical system, the author argues that there may be sound reasons for imbalances in allocation of health sector resources. Studies of the health care sector of developing countries often conclude that too much money is devoted to specialized urban hospitals rather than to primary health care institutions for the mass of the population and that a more equitable program requires a more decentralized allocation of resources. This paper examines the theoretical rationale underlying the medical referral system and holds that the operating characteristics of such a system must also be examined to appraise its efficiency and equity. The Tunisian system is evaluated in terms of the distribution of resources, structure of referral capacity and the extent of actual referral. Concludes that there are two principal structural deficiencies: rural patients who live far from the referral units do appear at a disadvantage in terms of probability of referral, mainly because of the cost of exercising the referral option; and congestion at the primary clinic level and inadequate capacity utilization of District Hospitals suggests the need for more resources at the base level institutions.

PN-AAD-394 Paper copy \$3.35
Microfiche \$1.00

**(421) STRATEGY FOR HEALTH AS A COMPONENT OF
THE SAHEL DEVELOPMENT PROGRAM**

Joseph, S. C.; Scheyer, S. C.
1977, 137p.

FHC (AID/afr-C-1138 GTS)

This document gives countries in the Sahel region of Africa a

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Index of Issuing Offices at the rear.

HEALTH

proposal that outlines a strategy to improve the health status of the population within the context of a general development framework. Special emphasis is placed on the health of mothers and children and of members of the labor force. Four major themes are presented: the importance of coordinating health services with other development activities; the importance of access to worldwide health services; the limits of current and future resources; and the great need for health services to peripheral villages. The current situation in the Sahel with regard to demography, disease, and of health infrastructure pattern is presented. Five health strategy premises discussed are: resource allocation, village-based health systems, demographic and health planning, components of an integrated village-based system, and health implications of planning in other sectors. The study explores various aspects of investment in health as a factor in socioeconomic development. These are: migration and resettlement projects, investments, health and the role of women, and the value of health. It presents organizational illustrations of health services at the village level, focusing on selection of candidates, training and employment, and support. The study recommends that the Sahelian states adopt a coordinated health strategy in the region. The design and implementation of national and regional health projects will put this strategy into practice.

PN-AAE-111

Paper copy \$12.15
Microfiche \$ 2.00

(422) THE SAHELIAN DROUGHT AND ITS DEMOGRAPHIC IMPLICATIONS

Caldwell, J. C.
1975, 92p.

OLC (AID/afr-635 GTS)

(In OLC paper no. 8)

In 1973, the author travelled through southern Algeria, Niger, Upper Volta and the countries of the Guinea Coast to assess the drought from the standpoint of a demographer. He compared this region with the conditions in Ethiopia, Sudan, drier parts of Cameroon, the Central African Republic, Kenya and Tanzania. The author reports on the region of the drought, the demographic consequences, the nomadic people of the area, the reaction to the 1970-74 drought, and the implications for the future. He expresses concern with the inability of demographers to react quickly to a crisis and feels that medical and nutritional conclusions are made with inadequate or inappropriate demographic information. He concludes that the drought had no severe effect on population growth. There is a discussion of medium-term development programs and long term assistance for the purpose of helping these countries prepare for drier years. Saving wealth from good years to meet the needs of bad ones is a function of modernization—of monetization and of individual and governmental savings and insurance schemes. So too is the demographic problem of the medium term reduction of mortality and the long term reduction of fertility.

PN-AAD-586

Paper copy \$8.40
Microfiche \$1.00

(423) WATER SUPPLY, DIARRHEAL DISEASE, AND NUTRITION, A SURVEY OF THE LITERATURE AND RECOMMENDATIONS FOR RESEARCH

Wall, J. W.; Keeve, J. P.
1974, 102p.

AID/TA/N

Investments for improving the water supplies in less developed countries have long been made on the assumption that they provide public health benefits, but this assumption has not been evaluated by well-designed research. This literature survey was conducted to assess what evidence past research offers concern-

ing the association between improved water quality and a reduced incidence of enteric disease. The literature does not offer much evidence. More information is needed concerning health benefits that can be expected from water supply investments, what conditions beyond improved water supply are needed to realize the expected health benefits, and how diseases affected by water interact with other diseases. Findings from the literature on the epidemiology of diarrheal disease reveal that its peak incidence and fatal effects occur among preschool children, particularly those in the process of being weaned. In this age group, fatal diarrheal disease is closely associated with nutritional deficiencies. This suggests that diarrhea and malnutrition interact synergistically. Some researchers argue that water quality is not an important factor in controlling diseases of weaning children, because infectious agents causing diarrhea do not come from a single contaminated source and the most important factor is the nutritional state of the child. Several long-term studies of diarrhea in weaning children have been conducted, but none has been specifically designed to study the role of water in diarrheal disease in weanlings. Such studies should be conducted, and they should be long-term, carefully designed and planned, and accorded adequate administrative, operational, and logistic support.

PN-AAD-507

Paper copy \$9.25
Microfiche \$2.00

HEALTH DELIVERY SYSTEMS

(424) THE DELIVERY OF MODERN DENTISTRY TO DEVELOPING REGIONS OF THE WORLD

Simmons, B. D.
1977, 25p.

DHI (AID/afr-G-1163 GTS)

Describes the dental equipment developed for the programs of Dental Health International (DHI) which works to bring dental health care to unserved areas of the world. DHI is a nonprofit foundation, and one of its main goals has been to develop the most reliable and portable dental clinic unit possible with existing technology and equipment. The total unit was to be self-contained and modular in design so that it could be carried by pack animal, jeep, plane, canoe, or human bearers to remote areas. DHI's most recent portable clinic, the DENHI-3A, is a simple, yet sophisticated and reliable one, and it can be disassembled and packed in aluminum containers. The dental equipment of this clinic, described in detail in this paper, includes fibreoptic lights, dental chairs, control unit, autoclave, X-ray unit and portable processor, and field chests. This equipment is for use in LDCs and any unserved rural areas.

PN-AAE-438

Paper copy \$2.00
Microfiche \$1.00

(425) A MODEL OF THE DEMAND FOR MEDICAL AND HEALTH SERVICES IN WEST MALAYSIA

Heller, P. S.
1976, 58p.

Mich. (CSD-2547 211d)

(In Discussion paper no. 62)

This study tests the validity of the assumption that the demand curve for health care is highly elastic with respect to time and to the price of public sector health care systems which have the goal of ensuring adequate medical care for the whole population. The data obtained from a 1975 household survey in West Malaysia is used here to develop a theoretical and econometric model of the demand for medical care. It examines: (1) whether the demand for outpatient and inpatient care is sensitive to its cost in time and financial resources; (2) whether the principal consumers are

those with the highest rates of illness; (3) whether the demand is elastic to income; (4) what factors lead patients to get treatment from traditional medical practitioners rather than modern medical facilities; (5) the explanation for the choice of private rather than public clinics; (6) whether the pattern of demand differs across cultures; and (7) what the income distributional impact is to subsidize medical demand appears inelastic to cash price, cost in time, or income. As incomes rise, households shift their demand from traditional practitioners and toward modern medical sources. This finding holds across ethnic groups in urban and rural areas.

PN-AAD-389

Paper copy \$5.55
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(426) THE JAPANESE RURAL HEALTH DELIVERY SYSTEM, A STUDY

Asia Foundation, San Francisco
1974, 67p.

Asia Found. (AID/asia-C-1106 GTS)

Japanese rural medical care is relevant for LDCs since the basic problem for developing countries is manpower. When the universal health insurance program was instituted in Japan and the demand for medical services rose, the shortage of doctors became a problem. Sufficient manpower for medical care was an important prerequisite to the spread of the clinical approach in rural health services. After World War II, occupational authorities upgraded the role of Japanese public health centers and community nurses. Wide-ranging programs included educational campaigns directed toward modernization of rural life-styles, improvement of public hygiene and disease prevention activities, and promotion of high standards of pediatric and obstetric care. The Japanese experience shows that developing nations can wisely concentrate on training public health nurses, since this takes much less time and money than training doctors, and nurses can fulfill a significant role in medical care. Public health efforts also need to be combined with social and economic development. Developing countries need to decide whether to develop a system of free medical care, or to follow the pattern of Japan and move toward major reliance on the private sector. In a system of free medical care, with government responsibility for all facilities and programs, the rewards must be enough to induce doctors to stay with the program. This has not been a serious problem in Japan because of the difficulties Japanese faced in language when they tried to study or practice in other countries. Japan did experience an unbalancing flow of doctors from country to city. It is desirable that governments bear the cost of training their doctors and medical personnel.

PN-AAD-545

Paper copy \$6.30
Microfiche \$1.00

HEALTH EDUCATION

(427) A SOCIAL MOTIVATION APPROACH FOR RURAL HEALTH IMPROVEMENT

De Sagasti, H. E. E.
1976, 78p.

AED (AID/ta-BOA-1060 GTS)

Presents a model for improving the health of the majority of the rural poor in developing countries using educational radio and community organization. The model was originally applied in

Costa Rica, but most components of the model can be transferred to similar projects in other countries. The approach used is mainly a social one and is directed toward building on existing social structures and processes. The model draws upon existing resources and emphasizes ways to direct unused media and human resources capacity toward the solution of health problems. Key components used in developing this model are a low cost, resources allocated to benefit the rural majority, independence of health personnel, and an emphasis on prevention and self-reliance in health. Educational technology is used to link a centralized radio station with existing local organizations which are the learning and action units. This approach stresses motivation more than instruction. Other components of the project include the reconciliation of central and local decision-making and responsibility and the allocation of scarce resources at the local level to motivated communities. It includes planning for those persons not initially interested. This document covers the financing of the model components, the utilization of project resources, the environmental situations in which the model is to be implemented, similar projects in Ecuador, Nicaragua, Tanzania, and the Philippines, and issues of feasibility. The discussion is accompanied by diagrams which summarize the approaches to be used.

PN-AAD-851

Paper copy \$7.25
Microfiche \$1.00

(428) EDUCATING THE PUBLIC ABOUT HEALTH THROUGH THE MASS MEDIA; GUIDELINES FOR PROJECT PLANNING IN LESS DEVELOPED COUNTRIES

De Sagasti, H. E. E.
1976, 26p.

AED (AID/ta-BOA-1060 GTS)

The guidelines described in this report call for increased attention to investment in health education. Health care systems in LDCs are often unable to provide better health for the majority of the people at an acceptable level of efficiency and at an affordable cost. A major barrier to reducing illness is a lack of change in the health habits of the public. Education in proper health practices is needed to change bad health patterns, to educate people to accept responsibility for their health, and to adopt a more active role in the provision of health services. Such education can take place in the home or the classroom, or through such means as communication between health personnel and patients, and through the mass media. Little knowledge is available on how to plan successful health education programs using the mass media; in the past, attention has been focused on the selection of available media rather than on efficient planning. This paper indicates that the use of the media in health education requires a multi-disciplinary approach to be effective, and it calls for the application of educational methods and techniques and of organizational and promotional skills to health problems. The guidelines are based on a social approach, rather than a purely methodological or technological approach, and they examine when health education is needed and when and how mass media should be used for health education. The paper includes a discussion of evaluation needs research data requirements, and the role of test projects.

PN-AAD-849

Paper copy \$2.15
Microfiche \$1.00

(429) TEACHING COMMUNITY MEDICINE, PHASE III; SEMI-ANNUAL REPORT, APRIL, 1977

Boston Univ. Center for Educational Development in Health
1977, 27p.

Boston (AID/ta-C-1355 GTS)

A PROJECT: To teach community medicine in less developed

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Index of Issuing Offices at the rear.

SCIENCE AND TECHNOLOGY

countries. The Center for Educational Development and Health at Boston University trains LDC health professionals in instructional design methods who in turn train health teachers in their own countries.

DURATION: June 1976-September 1979

DEVELOPMENTS: This report reviews the progress made to date and outlines plans for reporting future progress. A table summarizes the activities of trained personnel who provide leadership and who teach, their magnitude of output, and progress to date in the areas of field director training, instructional materials development, and services provided to the requesting countries of El Salvador, Guatemala, Nicaragua, Nepal, Bahrain, and Bolivia. Case studies made in those countries cite the work of specific individuals. Progress made during the reporting period was satisfactory and activities appear to be on or ahead of schedule, marked by a sharp increase in the number of country requests for technical assistance, reconnaissance visits and information about the services of the center for educational development in health. There is a description of plans for reporting period II, and after April 1977. A brief outline for strengthening a health delivery systems in twenty countries in West and Central Africa appears at the end of the report.

PN-AAE-046

Paper copy \$2.25
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(430) A COLOMBIAN ATTEMPT TO CONTROL MALNUTRITION AND DISEASE, 1968-74, THE PROMOTORA PROGRAM IN CANDELARIA, COLOMBIA

Drake, W. D.; Fajardo, L. F.
1976, 75p.

CSF (AID/ta-C-1121 Res.)

The nutritional and health characteristics of the semi-rural community of Candelaria, Colombia are analyzed using systematic observations of over 80% of all the children under six years old and their families. During the seven years of operation the program serviced 1840 different families. After a 6 month training period, girls between 16 and 21, (Promotoras), assumed the task of visiting all participating families every two months. These ten volunteers provided education on nutrition, hygiene and utilization of health services, gathered data including child height and weight, and referred sick children to a Health Service Unit staffed by four public health nurse aides. The overall management of the Health Center was directed by a general practitioner and a Public Health nurse. The major purpose of the program was to prevent disease and to reach children before illnesses required costly medical treatment. This analysis indicates that the program was successful for the following reasons: (1) In spite of an erosion in purchase power, the malnourishment rate in the child population dropped 25%. (2) The program reduced the incidence of diarrhea 20% to 50% depending upon the age of the child and the duration of time the family was in the program. (2) Girl malnourishment dropped 31% and boy malnourishment dropped 12%. (4) The education level of the parent, expenditures on food, and monthly income all affected the level of child malnourishment. (5) There was a decrease in real expenditures on food of 8.7%. (6) Consumption of food dropped, and a shift occurred from animal to vegetable protein. (7) The use of birth control increased from 18.7% to 43.6%. These seven factors are discussed in detail and are illustrated with tables and graphs.

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SCIENCE AND TECHNOLOGY

REMOTE SENSING

(431) RESOURCE SENSING FROM SPACE, PROSPECTS FOR DEVELOPING COUNTRIES

National Research Council. Board on Science and Technology for Int. Development
1977, 208p.

NAS (CSD-2584 GTS)

This report gives the findings and recommendations of a committee appointed by the National Academy of Sciences to consider the relevance of present and future earth resource sensing satellites to resource planning in developing countries. Economic development of a nation is dependent on its natural resources, yet many nations do not have enough knowledge of their own resources to use them effectively. Earth resources sensing satellites could be used to monitor crop yields, erosion, and pollution, to identify alterations in land use, to assess the damage from natural disasters, and to observe other environmental changes. This report describes the new technology for earth resource sensing from space, the tested use of satellite data in various sectors of application, and the improvement anticipated from future technological advances. The prospects and problems of use of this data are considered along with the international issues that need to be resolved. The report concludes with proposals for development assistance programs in remote sensing.

PN-AAD-644

Paper copy \$18.00
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(432) THE APPLICATION OF GEOCHEMICAL, BOTANICAL, GEOPHYSICAL, AND REMOTE SENSING MINERAL PROSPECTING TECHNIQUES TO TROPICAL AREAS, STATE-OF-THE-ART AND RESEARCH PRIORITIES

AID/TA/OST
1972, 79p.

AID/TA/OST

(In TA/OST 72-13)

Discusses new mineral prospecting techniques and their use in tropical countries. Economic and political considerations have thus far impeded mineral development in the tropics where many prospecting techniques are not as effective as in other regions. However, technologically advanced countries have developed promising new techniques which, with research, may be useful in tropical environments. Some of these are: airborne reconnaissance methods, geochemical prospecting, analytical and data processing methods, geobotanical and geophysical prospecting, remote sensing, radar mapping, multiband spectral imagery and multiband photography. Capital costs of installing research and prospecting equipment are substantial. Highly trained personnel are needed, and vast amounts of data are necessary to pinpoint the relatively few small areas worthy of detailed physical exploration. However, the development of mineral deposits in tropical lands would aid developing countries and would also benefit the rest of the world by increasing the supplies of raw materials.

PN-AAD-687

Paper copy \$7.30
Microfiche \$1.00

HOUSING TECHNOLOGY

(433) CURRENT RESEARCH IN BUILDING MATERIALS AND LOW-COST HOUSING IN SUB-SAHARA AFRICA

AID/SER/H
1976, 115p.

AID/SER/H

This summary of the survey in 1976 sponsored by the Office of

Housing of A. I. D. explores and synthesizes the work of organizations closely concerned with research, project development, and use of materials in low-cost housing in sub-Sahara Africa. Countries visited included Tanzania, Kenya, Ghana, and the Ivory Coast. The main body of the report, arranged by country, lists institutions and organizations which are carrying out research in this field, and supplies detailed entries which describe the work being done by some groups in some of those countries. Each entry presents a general description of an institution's objectives and areas of interest, as well as a list of its current projects and a list of related publications, most of which are briefly described. Many of the projects described in these individual entries concentrate on the use of indigineous materials for building, such as timber, soil blocks, or clay bricks. Examples of the kind of projects being carried out include housing studies, restoration, resettlement, and designs for specific climates.

PN-AAE-085 Paper copy \$10.30
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(434) TECHNIQUES FOR SULFUR SURFACE BONDING FOR LOW COST HOUSING

Southwest Research Inst., San Antonio, Tex.
1977, 130p.

SWRI (AID/ta-C-1057 Res.)

One goal of A. I. D. in supporting research on low-cost housing is to assist developing countries in the identification and use of construction materials which are locally available and are thus less expensive than imported materials. The Southwest Research Institute (SWRI) developed an experimental building construction technique that employed sulfur rather than cement for surface bonding. Because sulfur is abundant and inexpensive in many parts of the world, this substitute material, combined with an adapted technology, therefore appeared to be an attractive package for developing countries. To test the economic advantages and social acceptability of this construction technique, SWRI was awarded to contract a construct four test houses in each of three countries (Colombia, Tanzania, and Botswana). This handbook consists of several papers on sulfur bonding applications, includes photographs of buildings under construction, and is intended as a guidebook for use by individuals or organizations interested in using these techniques in their own countries. Titles of the papers are: "Surface Bonding Technique for Housing; Columbia, South America, Architectural Considerations"; "Technical Aspects of Surface Bonding"; "The Fire Risk in Low-Cost Housing"; "Surface Bonding Project from the Point of View of A. I. D. Mission in Colombia"; "Sulfur Surface Bonding of Mud Blocks in Africa"; and "Procedure Manual for Selecting Construction Materials."

PN-AAD-418 Paper copy \$11.55
Microfiche \$ 2.00

SOCIAL SCIENCES

(435) NEW APPROACHES TO THE MEASUREMENT OF VITAL RATES IN DEVELOPING COUNTRIES

Madigan, F. C.; Herrin, A. N.
1977, 140p.

N.C. (AID/PHA-C-1114 GTS)

(In Laboratories for population statistics reprint ser. no. 18)

This work is for demographers, statisticians, and other institutional staff persons who want to compare the estimates of vital data and rates from registration systems and censuses with the estimates from such alternative methodologies as the single and dual system approaches. It examines the analytic approaches

and describes project goals, sampling design, and organizational aspects of field operations. Results are presented for rural and urban fertility trends, differential fertility and levels of mortality and natural increase. Tables list the methodological and analytic problems posed by migration and the results from the application of the alternatives to the dual record system. A comparison of the different techniques using the same set of data is discussed. Cost reduction studies conclude that less expensive dual record projects are possible and that these projects will be able to produce high quality data.

PN-AAE-199 Paper copy \$12.40
Microfiche \$ 2.00

(436) HOUSEHOLD STUDIES WORKSHOP

DeTray, D. N.
1977, 9p.

ADC (CSD-2813 GTS)

(In RTN sem. rpt. no. 13)

Reports on the workshop held in Singapore in August 1976, by the Agricultural Development Council. The 52 participating anthropologists, nutritionists, and economists reported on research studies of various aspects of household behavior. Their major objective was to compare the approaches to the study of human behavior offered by each of the disciplines represented. This seminar review summarizes these various viewpoints in three parts: an overview of disciplinary perspectives on the study of family behavior; a more detailed outline of activities over the five days of the workshop; and a discussion of the major problems associated with the study of households in developing nations. There are suggestions for directions for future research. In discussing specific contributions from the 36 presentations which were made during sessions of the workshop, the study focuses on four areas: (1) an overview that summarizes disciplinary perspectives and broad categorizations of methodological and data-related problems, (2) measurement and analysis of nutritional status and food intake, (3) the transfer of economic concepts developed in Western, high income societies to low income developing societies, and (4) economic analysis of family behavior that attempts to extract behavioral patterns from data on family activities.

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URBAN DEVELOPMENT AND HOUSING

URBAN DEVELOPMENT

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

Rhoda, R. E.
1976, 110p.

AID/TA/UD

This report emphasizes the importance of analysis for successful urban and regional development. Understanding the development context and the impact of development efforts comes from careful analysis, and this report is a guide to types of urban and regional analysis. The analyses it offers can be used to identify and to think about projects, and they can be used to assist in

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URBAN DEVELOPMENT AND HOUSING

project formulation, justification, and detailed project design. Ten types of urban and regional analyses are detailed; these include: the national policy of urban and regional development, the distribution and characteristics of the poor, migration analysis, and a social analysis of the urban poor. Examples of the kinds of questions which can be addressed by each type of analysis are given, and it describes sources of information on each kind of analysis. To indicate the nature and depth of analysis needed for different situations, the report also offers descriptions of the use of urban and regional analysis in a number of A.I.D. programs.

PN-AAD-685

Paper copy \$9.90
Microfiche \$2.00

(438) REPORT ON THE AID URBAN DEVELOPMENT WORKSHOP, COLUMBIA, MD., 1972

AID/TA/UD
1972, 139p.

AID/TA/UD

The conference reported in this volume examined whether A.I.D. should be more involved in urban development assistance. It covers the rationale, the problems which should be addressed, and which activities should be developed. The consensus of the participants was that urban development should be of major concern to the Agency and that necessary additional steps should be taken and existing resources be reordered. The rationale was that rapid urbanization will be inevitable, that the role of cities will be crucial in national development, and that A.I.D. is already heavily involved in urban development. The workshop was not able to arrive at a satisfactory definition of the term "sector." The participants identified six critical problems which should be addressed: (1) lack of perception of the urgency of urban and their role in the process of national development; (2) lack of a national urban development policy in LDCs; (3) lack of diffusion of information on the problems of urban growth; (4) lack of coordination within A.I.D. and other agencies; (5) the need for institutional development and for better use of existing institutions; and (6) deficiencies in the state-of-the-art, including knowledge, use of resources, expertise, and a dearth of support for research in urban development. The following activities were recommended: Assess the impact of A.I.D. projects on urban development. Demonstrate the role of urban development in national development. Promote and sponsor information dissemination activities in urban development. Develop manpower for urban development efforts. Support and encourage activities that would contribute to development of national urban policies or strategies.

PN-AAD-506

Paper copy \$12.30
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(439) THE U.S. URBAN DEVELOPMENT EXPERIENCE, A SELECTIVE ANALYTICAL COMPENDIUM

Dialogue Systems, Inc., New York
1974, 244p.

DSI (AID/CM/ta-C-73-48 GTS)

Discusses how the experience of the U.S., in its transformation from an agricultural to an industrial and service-oriented economy, may offer some concepts that can be adapted and applied in developing countries. Unlike the U.S., developing countries are having to face rapid urban growth along with growing population, growing unemployment, and economies con-

strained by inflexible international business and trading relationships. Other constraints include culture, climate, resource shortages, and the environment. Sections of this report discuss the historical background of U.S. urban development, urban-housing and building, urban transportation, social services, manpower and labor mobility, and planning and growth policy. The U.S. urban experience has, in retrospect, been a story of unanticipated side effects and unintended consequences. Approaches to housing in the U.S., whether public or private, seldom have met the housing needs of the nation's poor and low-income families. For the developing countries, restraints on motor vehicles are likely to be the most effective means of avoiding air pollution and congestion. The U.S. experience of utilizing the public school systems for delivery of certain health and social services can effectively be applied in developing countries. U.S. experience in manpower planning suggests that manpower measures cost less and yield more if they are preventive or anticipatory rather than remedial, and they are dealt with in conjunction with other dimensions of economic and urban planning. U.S. experience with urban growth shows that there is no ideal model.

PN-AAD-536

Paper copy \$21.00
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(440) LAND USE AND THE INTERMEDIATE-SIZE CITY IN DEVELOPING COUNTRIES; WITH CASE STUDIES OF TURKEY, BRAZIL, AND MALAYSIA

Rivkin, M. D.
1975, 143p.

Rivkin Assoc. (AID/ta-G-1081 Res.)

Land use programming is needed in order to reach local and regional development goals and to avoid the chaos that often goes with rapid growth. This publication can serve as a useful guide for the Office of Urban Development of A.I.D. in its development of field demonstrations of land-use programming for cities experiencing rapid growth. Cities examined in detail in the study are Antalya, Turkey; Goiania, Brazil; Penang, Malaysia; and Merida, Venezuela; each city ranges in population from 100,000 to 500,000. They are significant industrial or processing centers, and are targets for rural migration, thereby offering a serious challenge to each nation's capacity for allocating resources. Their environments strain the capacity of national resource management and require adaptation among politicians, planners, and governmental agencies at the national, regional, and local levels. This report examines the development context in which the intermediate city has evolved, reviews the land-use planning and control techniques that could be used in other cities, and recommends approaches to international assistance.

PN-AAD-686

Paper copy \$12.65
Microfiche \$ 2.00

(441) SERVICES AND DEVELOPMENT IN FIVE INDONESIAN MIDDLE CITIES

Atmodirono, Abukasan; Osborn, James
1974, 290p.

AID/ASIA/USAID/Indonesia

In order to examine development planning in Indonesia and the role major cities can play in development, a study was conducted from 1971 to 1974 to collect and analyze data on the administration of services by five major cities: Surabaya, Medan, Ujung Pandang, Semarang, and Pedang. Each city is the capital of its province and is the social and economic center of its region. Data for each city were collected on the following services: power, water and sewerage, roads and bridges, education, terminals, health, communications, markets, public safety, social welfare, and recreation. Tables in this report display aggregate amounts

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BIBLIOGRAPHIES

of expenditures, usage, charges, the administrative agencies involved, and their budgets. Conclusions from the study are: (1) If the national government is to decentralize development responsibility, cities need increased taxation power or guaranteed transfers of funds from higher governments, so the city governments can plan and implement long-term development projects. (2) City government officials are in need of training in the administrative sciences. (3) A key ingredient of a national policy that will utilize the potential of the cities for contributing to development is a unified strategy of national development.

PN-AAD-497

Paper copy \$24.85
Microfiche \$ 3.00

(442) URBAN FUNCTIONS IN RURAL DEVELOPMENT: BICOL RIVER BASIN PILOT PROJECT, THE PHILIPPINES; QUARTERLY REPORT, MARCH-MAY 1977

Rondinelli, D. A.
1977, 33p.

Rondinelli (AID/ta-C-1356 GTS)

A PROJECT: The project objectives are to develop a plan for strengthening the contributions of urban centers (functions, activities, and services) to rural development in the Bicol River Basin, and to develop a planning process-potentially valid for application in other LDCs. This is the first in a series of pilot projects in Asia, Latin America, and Africa.

DATES: Sept. 1976-March 1978

DEVELOPMENTS: The Government of Philippines staff has produced a thorough and almost complete compilation of existing information on socio-economic conditions and physical resources in the Basin, organized by municipality. Analytic methods have been adopted that are simple, easy to understand, and able to be performed manually and presented visually. The methodology includes three components. Preparation of a socio-economic, demographic, and physical profile of urban and rural subareas will provide an inventory and baseline study. Secondly, analysis of centrality, functional complexity and hierarchy of settlements will be done. The third method is threshold analysis. A number of linkage studies are underway and scheduled for completion by August, 1977. These are briefly described. A preliminary list of topics, issues and analyses for inclusion in the final report is presented.

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Other reports in this series are:

PN-AAD-037 (Dec. 1976-Feb. 1977, 33p.)

Paper copy \$2.75
Microfiche \$1.00

PN-AAD-636 (Sept.-Nov. 1976, 28p.)

Paper copy \$2.35
Microfiche \$1.00

HOUSING

(443) BOLIVIA SHELTER SECTOR ASSESSMENT

Robbins, E. H.; Ynastrillia, Antonia; Clifton, C. W.
1976, 145p.

AID/SER/H

Assesses the shelter sector in Bolivia, drawing on data collected from a census conducted by the National Saving and Loan League during field work performed in 1976. Analysis of the data reveals that housing institutions in Bolivia are not producing sufficient quantities of low and medium priced housing to meet the needs and demands present. The chapters in the report analyze aspects of this problem. National socioeconomic conditions are discussed, and data is given on population, family size and composition, migration, family economics, housing stock, and national economic conditions. There is an overview of three aspects of the housing sector: policies and institutions, housing

finance, and housing programs, past and present. This paper covers the national housing law and the five year plan, describes the work of the various institutions involved in the housing sector, lists institutions involved in housing finance, and reviews the past and present housing programs in the public and private sectors. The costs and techniques of housing production are presented with detailed information on the construction industry, construction materials and costs, labor, land and urbanization, construction methods, and unit design and cost. The final chapter is an environmental impact discussion.

PN-AAE-054

Paper copy \$12.80
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For other reports in this series, see ARDA 5:1, no. 133 and ARDA 5:2, no. 280.

(444) HOUSING FINANCE IN THE KOREAN ECONOMY

Richard T. Pratt Assoc. Inc., Salt Lake City, Utah
1977, 160p.

Pratt (AID/otr-C-1402 GTS)

This report summarizes the major problems which hinder both the present and future functioning of the Korean Housing Finance System. Information was derived from a study conducted in 1976 by Pratt Associates under the auspices of the Office of Housing of A.I.D. It provides preliminary recommendations for action for the areas important for housing finance. Few countries can match the high rate of growth of the strong housing finance system which has occurred in Korea during the last 15 years. The factors in the economy of Korea which have contributed to this growth are population growth and GNP, inflation, private savings, and capital investment. The study assesses the role of interest rates in the economy and in the housing finance market, and it explores problems in setting and administering interest rates. It discusses the financial system, the Korean Housing Bank (KHB), and the Korean National Housing Corporation (KNHC). It also assesses the roles of the Bank of Korea, special banks, commercial banks, and mortgage lending, and it presents such facets of the KHB as deposits, national housing funds, and the housing lottery. The sources and uses of the funds of the KNHC are examined. In the economy of Korea there is a well-developed governmental system for planning and monitoring economic growth. The economic planning bureau has developed a fourth five-year plan for the period extending from 1976 through 1981. This report reviews the role of housing finance in this plan. Tables present information on major points of the study, and appendices summarize such areas in the housing finance program as the raising of housing funds and the housing finance system.

PN-AAE-124

Paper copy \$14.05
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BIBLIOGRAPHIES

AGRICULTURE

(445) UNEMPLOYMENT AND UNDEREMPLOYMENT IN RURAL SECTORS OF THE LESS DEVELOPED COUNTRIES, A BIBLIOGRAPHY

Jessee, D. L.; Brannon, R. H.
1977, 154p.

AID/TA/AGR/ESP

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BIBLIOGRAPHIES

(In AID/TA/AGR/ESP. Occasional paper no. 6)

This bibliography is based on a literature search done for the preparation of papers for USAID and USDA which dealt with rural sector unemployment and underemployment in less developed countries. Four major subject areas are treated: the nature and scope of employment and income problems; technological impacts upon employment and income; agrarian sector policies designed to increase employment and income; and general discussions of the roles of the rural sector and other sectors in regional or national economic development. These four areas are further divided into 13 topical areas arranged by geography. The literature, all written within the last 20 years, is limited mainly to available English language publications and to a selected number of journals, books, and publications of major international organizations. Documents which are not specific to a region and which have useful information are organized into sections titled "In General" at the beginning of each topic. Some works are cross-listed among topics. The emphasis, in this collection of over 1400 works, is upon those materials which provide economic analyses and interpretations.

PN-AAD-793

Paper copy \$13.55
Microfiche \$ 2.00

(446) BIBLIOGRAPHY OF THE SOILS OF THE TROPICS; V. 2, TROPICS IN GENERAL AND TROPICAL SOUTH AMERICA

Orvedal, A. C.
University Consortium on Soils of the Tropics
1977, 248p.

AID/TA/AGR

(In Technical ser. bul. no. 17)
(Vol. 1, Tropics in general and tropical Africa, 228p. PN-AAB-703)

The purpose of this bibliography is to make relevant contents of the Soil Geography Unit of the Soil Conservation Service available to university researchers and others. The collection of the Soil Geography Unit was started in 1945. More than four thousand citations are grouped under a geographic heading according to texts or maps. This is the second of several volumes planned. Each will contain, as its first part, those citations relevant to the Tropics in general without orientation to any single continent or country. The second part will pertain to tropical parts of continents, or to large island groups, and to countries or other geographic entities within these large regions. The citations are mainly about soils in South America. Citations to soil maps are included as well as references on geology, landforms, vegetation, climate, and land use.

PN-AAD-717

Paper copy \$21.35
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Paper copy \$19.70
Microfiche \$ 3.00

(447) DRYLAND AGRICULTURE BIBLIOGRAPHY, A LIST OF MATERIALS ON AGRICULTURE OF SEMIARID TEMPERATE REGIONS

Riehl, S. K.; Kinch, Michael; Baker, Robert
1976, 169p.

Or. State (AID/ta-G-1221 211d)

This bibliography compiles over 1400 articles and book titles in English written during the last 60 years on the subject of dryland agriculture. Materials are listed by main author and include title and date, citation, number of pages, subject headings, the Library of Congress call number where available, the accession number, and a cross index feature. All of the materials are held in

the Kerr Library at Oregon State University. Non-copyrighted material from this collection is available through the University's photocopy service.

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(448) LOSSES WHICH OCCUR DURING HARVESTING AND STORAGE OF GRAINS, A BIBLIOGRAPHY

Mphuru, A. N.
1976, 78p.

Kan. State (AID/ta-C-1162 GTS)

(In Special rpt. no. 4)

This bibliography draws together what has been published or reported on grain storage losses/damage/estimation and detection. The main efforts toward increased food production have been directed toward greater agricultural production through better cultivation, high-yield varieties, and better fertilizers and insecticides. The necessity for good storage has not received sufficient recognition, partly because of a lack of understanding of the magnitude of losses occurring during harvesting and storage. Data on storage losses can be used as: (1) a tool for directing future research and planning; (2) a basis for calculating justifiable expenditures on control; (3) a basis for estimating damage; (4) a means of evaluating the effectiveness of control measures; and (5) a basis for evaluating harvesting machines and machine components with respect to the damage they cause or produce. The bibliography is divided into four sections. The first pertains to internal infestation and detection procedures. The second concerns losses due to insects, rodents, and birds. The third is on harvesting, handling, conditioning, and processing losses. The last section covers literature on nutrient, fungal, and germination losses. The four sections contain 705 citations.

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(449) A BIBLIOGRAPHY OF YAMS AND THE GENUS DIOSCOREA

Lawani, S. M.; Odubanjo, M. O.
1976, 199p.

IITA (AID/ta-G-1251 GTS)

This bibliography on yams bring together the scattered literature on the genus *Dioscorea* from the early nineteenth century through 1975. The 1,562 entries in this bibliography are grouped into 36 subject categories, and arranged within each category alphabetically by author. Some entries, particularly those whose titles are not sufficiently informative, are annotated. The major section titles in the book are as follows: general and reference works; history and geography; social and cultural importance; production and economics; botany (including taxonomy, genetics, and breeding); yam growing (including fertilizers and plant nutrition); pests and diseases; storage; processing; chemical composition, nutritive value, and utilization; toxic and pharmacologically active constituents; author index; and subject index. Most entries are in English, with a few in French, Spanish, or German.

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(450) AN ANNOTATED BIBLIOGRAPHY OF SOYBEAN DISEASES, 1882-1974

Sinclair, J. B.; Dhingra, O. D.
1975, 287p.

Ill. (AID/CM/ta-C-73-19 Res.)

(In INTSOY ser. no. 7)

One of the goals of the International Soybean Program is the development and maintenance of information systems to serve soybean research workers and educators in tropical and subtropical areas, as well as organizations and individuals in the United States and those in the international agricultural development network with interest in soybeans. The function of this bibliography is to make soybean disease literature available to agricultural workers throughout the world. There are 2,263 citations. Whenever possible, the authors' original abstracts are used with editing for consistency of style and reduction of length. Papers printed in a language other than English are so indicated. The index is divided into six major sections according to the causal agent of disease: fungi, bacteria, nematodes, viruses, nonparasitic diseases and other *Glycine* species, and seedborne microorganisms and viruses.

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AUTHOR INDEX

Name	Item number(s) in this issue	Name	Item number(s) in this issue
Abel, M. E.	(298)	Dialogue Systems, Inc.	(439)
Academy for Educational Development	(401), (407), (412)	Dorner, Peter	(303)
Adams, Peter	(323)	Drake, W. D.	(430)
Agr. Development Council	(303)	Drilon, J. D.	(300)
AID/PPC/PDA	(369)		
AID/SER/H	(433)	Eighmy, T. H.	(346)-(349)
AID/TA/AGR	(322)	Emery, J. C.	(390)
AID/TA/DA	(367)	Evenson, R. E.	(295)
AID/TA/EHR	(409)	Ewel, Jack	(329)
AID/TA/N	(340)		
AID/TA/OST	(432)	Fahey, D. J.	(331)
AID/TA/UD	(438)	Fajardo, L. F.	(430)
Akino, Masakatsu	(294)	Fitzharris, J. C.	(294)
Alves, E. R. S.	(297)	Fogel, B. L.	(377)-(379)
Anderson, D. C.	(337)	Foote, Dennis	(410)
Anderson, D. E.	(312)	Franklin, David	(297)
Andrew, C. O.	(325)	Friend, Jamesine	(416)
Apte, Judith	(354)		
Ardila, Jorge	(294)	Georgetown Univ. Public Services Lab.	(382)-(388)
Arndt, T. M.	(293)	Glaser, Ezra	(387)
Ashkenaz, Eleanor	(354)	Goldenberg, Ted	(391)
Asia Foundation	(426)	Gopalswamy, T. P.	(358)
Atmorodino, Abukasan	(441)	Governmental Affairs Inst.	(306)
Auburn Univ. Int. Center for Aquaculture	(335)	Graham, Michael	(316)
Austin, J. E.	(341)-(345)	Green, J. W.	(305)
Axinn, G. H.	(391)		
Axinn, N. W.	(391)	Hagen, S. K.	(325)
		Hamilton, R. A.	(325)
Baker, Robert	(447)	Hanson, Haldore	(296)
Bal, H. K.	(294)	Harper, J. M.	(338)
Barkenbus, J. N.	(408)	Harris, E. J.	(325)
Benda, G. T. A.	(326)	Harvard Univ. Business School	(300)
Billings, B. B.	(382)-(386), (388)	Harvard Univ. School of Public Health	(341)-(345)
Binswinger, H. P.	(298)	Hayami, Yujiro	(294)
Bliss, F. A.	(318)	Heller, P. S.	(420), (425)
Boston Univ. Center for Educational Development in Health	(429)	Herrin, A. N.	(435)
Boynton, P. L.	(396)	Hertford, Reed	(294)
Brady, N. C.	(296)	Honadle, George	(307), (308)
Brannon, R. H.	(445)	Hook, R. M.	(309)
Braun, J. R.	(415)	Hornik, R. D.	(362), (411)
Briggs, William	(312)	Hugo, Cornelius	(312)
Brown, Albert	(365)		
Byerlee, Derek	(302)	Ingle, H. T.	(409)
		Ingle, M. D.	(307), (308)
Caldwell, J. C.	(422)	Instituto de Nutricion de Centro America y Panama	(360), (366)
Cantor, S. M., and Associates	(353)-(359)	Intech, Inc.	(350)
Caton, Douglas	(304)	Int. Council for Education Development	(377)-(379)
Checchi and Co.	(346)-(349)	Int. Development Research Centre, Ottawa	(316)
Clifton, C. W.	(443)	Int. Sorghum Workshop, Univ. of Puerto Rico, 1975	(317)
Cock, James	(316)	Int. Vitamin A Consultative Group	(351)
Conde, Louis	(329)	Int. Working-Level Conf. on the Use of Satellites for Telecommunications Systems, Denver, Colo., 1974	(409)
Conf. and Workshop on Non-Formal Education and the Rural Poor, Mich. State Univ., East Lansing, 1976	(394)		
Conf. on Group Farming, Univ. of Wis., 1975	(303)	Jamison, D. T.	(406), (413)
Conf. on Resource Allocation and Productivity in National and Int. Agr. Research, Airlie House, Va., 1975	(293)-(298)	Jansen, G. R.	(338)
Cowlan, B. S.	(410)	Jessee, D. L.	(445)
Crawford, J. G.	(293), (296)	Jha, Dayanath	(294)
Cross, J. G.	(372)	Job, B. L.	(368)
		Jones, S. E.	(315)
Dalrymple, D. G.	(295), (299)	Joseph, S. C.	(421)
Danner, H. E.	(379)		
de Janvry, Alain	(298)	Kahlon, A. S.	(294)
De Sagasti, H. E. E.	(362), (403)-(405) (427), (428)	Keeve, J. P.	(423)
DeTray, D. N.	(436)	Kelso, B. F.	(321)
Dhingra, O. D.	(450)	Kinch, Michael	(447)
		Kiros, F. G.	(382)

Name	Item number(s) in this issue	Name	Item number(s) in this issue
Kislev, Yoav	(295)	Rondinelli, D. A.	(442)
Klees, S. J.	(413)	Ruttan, V. W.	(293)
Konig, J. W.	(331)		
Kothari, K. B.	(356), (359)	Sachse, J. M.	(320)
Krishnamurti, Lakshmi	(354)	Saxena, P. M.	(294)
		Schaefer, Kalmann	(357)
Laundrie, J. F.	(330)-(334)	Schenkkan, R. F.	(397)-(399)
Lawani, S. M.	(449)	Scheyer, S. C.	(421)
League for Int. Food Education	(314)	Schmitz, A.	(294)
Leavitt, H. B.	(369)-(399), (407)	Schuh, G. E.	(298)
Lerner, H. A.	(346)-(349)	Schultz, T. W.	(293)
Levine, Victor	(389)	Schutjer, W. A.	(301)
Lockheed, M. E.	(390)	SEARCA	(300)
Lopez, Michael	(371)	Searle, Barbara	(416), (417)
		Sehgal, S. M.	(297)
McAnany, E. G.	(411), (414)	Sem. on the Food Industry in West Africa, Univ. of Ghana, 1974	(340)
MacIntyre, Reginald	(316)	Shumway, C. R.	(297)
Madigan, F. C.	(435)	Simmons, B. D.	(424)
Maehler, K. L.	(325)	Simmons, E. B.	(310)
Manly, R. P.	(346)-(349)	Sinclair, J. B.	(450)
Manoff Int., Inc.	(363)	Smith, V. E.	(364)
Mayo, J. K.	(411)	Soil Resource Inventory Workshop, Cornell Univ., 1977	(322)
Mass. Univ. Center for Int. Education	(393), (395)	Southwest Research Inst.	(434)
Mellor, J. W.	(298)	Spencer, D. S. C.	(302)
Mitchell, W. C.	(325)	Stanford Univ. Inst. for Communications Research	(419)
Moffatt, Michael	(354)	Stanford Univ. Inst. for Mathematical Studies in the Social Sciences	(418)
Monson, T. D.	(380)	Straub, G. A.	(392)
Montgomery, Barbara	(370)	Summerskill, John	(390)
Moock, J. L.	(389)	Suppes, Patrick	(406), (416)
Moseman, A. H.	(297)	Swanson, B. E.	(296)
Mosher, A. T.	(293)	Sym. of the Int. Society for Tropical Root Crops, 4th, Cali, Colombia, 1976	(316)
Mphuru, A. N.	(448)		
Mushkin, S. J.	(382)-(386), (388)	Texas A&M Univ.	(328)
Myers, G. C.	(333)	Texas A&M Univ. Food Protein R&D Center	(339)
		Thailand. National Council for Women of Thailand	(311)
National Research Council. Board on Science and Technology for Int. Development	(431)	Thammasat Univ. Faculty of Social Administration	(311)
Nebraska Univ. College of Agr.	(319)	Thiagarajan, Deborah	(354)
Neff, K. L.	(394)	Thiagarajan, P. S.	(359)
Nichols, D. G.	(381)	Thomas, J. W.	(309)
Niehoff, R. O.	(394)	Thompson, K. W.	(378)
Norvell, D. G.	(392)	Trujillo, Carl	(294)
		Tuso, Hamdesa	(391)
Odubanjo, M. O.	(449)		
Orvedal, A. C.	(446)	Ulbricht, T. L. V.	(297)
Osburn, James	(441)	University Consortium on Soils of the Tropics	(446)
Park, Choon-yup	(376)	Van der Veen, M. G.	(301)
Pastore, Jose	(297)	Van Haeften, R. K.	(304)
Peterson, Willis	(294)	Vermillon, M. A.	(415)
Pfost, H. B.	(312)		
Phillips, Richard	(313)	Waddle, B. M.	(315)
Pinstrup-Anderson, Per	(297)	Waterston, Albert	(306)
Ponnamperuma, F. N.	(324), (327)	Wahlgren, H. E.	(332)
Poynor International, Inc.	(352)	Wall, J. W.	(423)
Practical Concepts, Inc.	(400)	Weisskopf, T. E.	(373)
Pratt, Richard T., Assoc., Inc.	(444)	Wells, Stuart	(402), (406)
		Welsch, D. E.	(298)
Quinterro, Socorro	(374), (375)	Wilson, David	(338)
		Wis. Univ. Dept. Horticulture	(318)
Radosevich, G. E.	(336)	Wis. Univ. Land Tenure Center	(303)
Rajagopalan, S.	(355)	Woodberry, Constance	(311)
Ramalho de Castro, J. P.	(298)	Workshop on Improving the Nutrition of the Most Economically Disadvantaged Families	(314)
Rasmusen, Mark	(361)	Wortman, Sterling	(296)
Rhoda, R. E.	(437)		
Rhode, R. H.	(325)	Yanstrilla, Antonia	(443)
Richmond, T. R.	(315)	Young, Kan-hua	(390)
Riehl, S. K.	(447)		
Rivkin, M. D.	(440)		
Robbins, E. H.	(443)		
Rocha, Andres	(294)		
Rogers, E. M.	(415)		

INDEX OF ISSUING OFFICES

Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue	Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue
ADC	(293)-(298), (303)	AID/TA/N	(340)
Agricultural Development Council	(436)	Office of Nutrition	
650 Fifth Avenue		Bureau for Development Support	
New York, New York 10020		Agency for International Development	
(CSD-2813 GTS)		Washington, D.C. 20523	
AED	(361), (362), (392)	AID/TA/OST	(432)
Academy for Educational Development, Inc.	(396)-(399), (401)	Office of Science and Technology	
1414 22nd Street, N. W.	(403)-(405), (407)	Bureau for Development Support	
Washington, D.C. 20037	(409), (412), (414)	Agency for International Development	
(AID/ta-BOA-1377 GTS)	(427), (428)	Washington, D.C. 20523	
(AID/ta-BOA-1060 GTS)			
(AID/CM/la-C-73-19 GTS)			
(CSD-2506 GTS)			
(AID/ta-C-1056 GTS)			
(AID/afr-828)			
AID/ASIA/USAID/Indonesia	(441)	AID/TA/RD	(305), (336), (442)
USAID/Indonesia		Office of Rural Development	
Agency for International Development		Bureau for Development Support	
Washington, D.C. 20523		Agency for International Development	
		Washington, D.C. 20523	
AID/ASIA/USAID/Thailand	(311)	AID/TA/UD	(437), (438)
USAID/Thailand		Office of Urban Development	
Agency for International Development		Bureau for Development Support	
Washington, D.C. 20523		Agency for International Development	
(AID-493-7003-T)		Washington, D.C. 20523	
AID/NE/USAID/Tunisia	(320), (321)	AIR	(381)
USAID/Tunisia		American Institutes for Research	
Agency for International Development		Suite 200, 1055 Thomas Jefferson St., N. W.	
Washington, D. C. 20523		Washington, D.C. 20007	
(PASA 276-04-72 GTS)		(AID-490-7 GTS)	
AID/PPC/PDA	(369)	Asia Found.	(426)
Office of Policy Development and Analysis		Asia Foundation	
Bureau for Program and Policy Coordination		P.O. Box 3223	
Agency for International Development		San Francisco, California 94119	
Washington, D.C. 20523		(AID/asia-C-1106 GTS)	
AID/SER/H	(433), (443)	ATAC	(365)
Office of Housing		American Technical Assistance Corp.	
Bureau for Program and Management Services		Westgate Research Park	
Agency for International Development		McLean, Virginia 22101	
Washington, D.C. 20523		(AID/afr-C-1142 GTS)	
AID/TA/AGR	(304), (446)	Auburn	(335)
Office of Agriculture		International Center for Aquaculture	
Bureau for Development Support		Auburn University	
Agency for International Development		Auburn, Alabama 36830	
Washington, D.C. 20523		(CSD-2780 211d)	
AID/TA/AGR/ESP	(301), (445)	Boston	(429)
Division of Agricultural Economics and Sector Planning		Center for Educational Development in Health	
Office of Agriculture		Boston University	
Bureau for Development Support		Boston, Massachusetts 02215	
Agency for International Development		(AID/ta-C-1355 GTS)	
Washington, D.C. 20523		Calif-Berkeley	(325)
AID/TA/DA	(367)	Dept. of Entomological Sciences	
Office of Development Administration		University of California, Berkeley	
Bureau for Development Support		Berkeley, California, 94720	
Agency for International Development		(AID/ta-C-1195 GTS)	
Washington, D.C. 20523		Calif-Berkeley	(402)
AID/TA/EHR	(377)- (379), (408)	School of Education	
Office of Education and Human Resources	(410)	University of California, Berkeley	
Bureau for Development Support		Berkeley, California 94720	
Agency for International Development		(AID/CM/ta-C-73-17 211d)	
Washington, D.C. 20523		Cantor	(353)-(359)
		S. M. Cantor Associates, Inc.	
		P.O. Box 239	
		Haverford, Pennsylvania 19041	
		(AID/nesa-399 GTS)	

Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue	Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue
Cecchi	(346)-(349)	Harvard	(309)
Cecchi and Company 1730 Rhode Island Ave., N. W. Washington, D.C. 20036 (AID/CM,/otr-C-73-199 GTS)		Center for International Affairs Harvard University Cambridge, Mass. 02138 (AID/otr-C-1417 Res.)	
CIAT	(316)	Harvard	(300)
International Center for Tropical Agriculture Apartado Aereo 6713 Cali, Colombia (AID/ta-G-1090 GTS)		Harvard Business School Harvard University Cambridge, Mass. 02138 (CSD-3153 GTS)	
Cornell	(322)	Harvard	(341)-(345)
Dept. of Agricultural Economics Cornell University Ithaca, New York 14850 (CSD-2834 211d)		School of Public Health Harvard University Cambridge, Mass. 02138 (AID/ta-C-1172 GTS)	
Cornell	(323)	Honadle/Ingle	(307)-(308)
Dept. of Agronomy Cornell University Ithaca, New York 14850 (AID/ta-C-1104 Res.)		Office of Rural Development Bureau for Development Support Agency for International Development Washington, D.C. 20523	
CSF	(430)	IITA	(449)
Community Systems Foundation 1130 Hill Street Ann Arbor, Michigan 48104 (AID/ta-C-1121 Res.)		International Institute for Tropical Agriculture PMB 5320 Ibadan, Nigeria (AID/ta-G-1251 GTS)	
DHI	(424)	Ill.	(450)
Dental Health International 847 South Milledge Ave. Athens, Georgia 30601 (AID/afr-G-1163 GTS)		College of Agriculture University of Illinois Urbana, Illinois 61801 (AID/CM/ta-C-73-19 Res.)	
DSI	(439)	Intech	(350)
Dialogue Systems, Inc. 285 Madison Ave. New York, New York 10017 (AID/CM/ta-C-73-48 GTS)		Intech, Inc. 814 Thayer Ave. Silver Spring, Maryland 20910 (AID/ta-C-1115 GTS)	
ETS	(389), (390)	IRRI	(324), (327)
Educational Testing Service Princeton, New Jersey 08540 (AID/ta-C-1347 GTS)		International Rice Research Institute P.O. Box 933 Manila, Philippines (AID/ta-G-1074 GTS)	
Experience	(315)	Kan. State	(312), (313), (448)
Experience, Inc. Suite 800, 1930 Dain Tower Minneapolis, Minnesota 55402 (AID/afr-C-1130 GTS)		Food and Feed Grain Institute Kansas State University Manhattan, Kansas 66502 (AID/ta-C-1162 GTS)	
FHC	(421)	LIFE	(314)
Family Health Care, Inc. 1910 K Street N. W. Washington, D.C. 20036 (AID/afr-C-1138 GTS)		League for International Food Education Room 404, 1126 16th St., N.W. Washington, D.C. 20036 (AID/ta-C-1071 GTS)	
GAI	(306)	Manoff	(363)
Governmental Affairs Institute 1776 Mass. Ave., N.W. Washington, D.C. 20036 (CSD-3630 GTS)		Manoff International, Inc. 2080 L St., N.W. Washington, D.C. 20036 (AID-518-345-T GTS)	
Ga. IT	(374)-(376)	Mass.	(393), (395)
Industrial Development Division Engineering Experiment Station Georgia Institute of Technology Atlanta, Georgia 30332 (AID/CM/ta-G-73-18 211d)		Center for International Education University of Massachusetts Amherst, Mass. 01002 (AID/la-699 GTS) (AID/ta-G-1122 211d)	
Georgetown	(382)-(388)	Mich.	(369)-(373), (380)
Public Services Laboratory Georgetown University Washington, D.C. 20057 (AID/CM/ta-C-73-8 GTS)		Center for Research in Economic Development University of Michigan Ann Arbor, Michigan 48108 (CSD-2547 211d)	(420), (425)

Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue	Name and Address of Issuing Unit & Contract/Grant Number	Item Number(s) in this issue
Mich. State	(302), (364)	Pratt	(444)
Dept. of Agricultural Economics Michigan State University East Lansing, Michigan 48824 (CSD-3625 211d) (CSD-2826 211d)		Richard T. Pratt Associates, Inc. P.O. Box 8334 Salt Lake City, Utah 84108 (AID/otr-C-1402)	
Mich. State	(391), (394)	Puerto Rico	(317)
Non-Formal Education Center Michigan State University East Lansing, Michigan 48824 (AID/CM/ta-C-73-22 GTS)		College of Agricultural Sciences Puerto Rico University Mayaguez, Puerto Rico 00708 (AID/ta-C-1184 GTS)	
MUCIA	(368)	Rivkin	(440)
International Development Institute Indiana University Bloomington, Indiana 47401 (CSD-2958 211d)		Rivkin Associates, Inc. 2900 M Street, N.W. Washington, D.C. 20037 (AID/ta-G-1081 Res.)	
NAS	(431)	Rondinelli	(442)
Board for Science and Technology in International Development National Academy of Sciences—National Research Council 2101 Constitution Ave., N.W. Washington, D.C. 20418 (CSD-2584 GTS)		Office of Rural Development Bureau for Technical Development Agency for International Development Washington, D.C. 20523 (AID/ta-C-1356 GTS)	
N.C.	(435)	Stanford	(406), (411), (413) (415)-(419)
Carolina Population Center University of North Carolina Chapel Hill, North Carolina 27514 (AID/PHA-C-1114 GTS)		Dept. of Communication Cypress Hall Stanford University Stanford, California 94305 (CSD-3284 Res.) (AID/ta-G-1053 211d) (AID/CM/ta-C-73-40 Res.)	
Neb.	(319)	SWRI	(434)
Dept. of Agronomy University of Nebraska Lincoln, Nebraska 68503 (AID/ta-C-1093 Res.)		Southwest Research Institute P.O. Drawer 28510 San Antonio, Texas 78284 (AID/ta-C-1057 Res.)	
Nutrition Found.	(351)	Tex. A&M	(328)
Nutrition Foundation 489 5th Avenue New York, New York 10017 (AID/ta-C-1375 GTS)		Dept. of Plant Pathology Texas A&M University College Station, Texas 77843 (AID/ta-C-1092 Res.)	
OLC	(310), (422)	Tex. A&M	(339)
Overseas Liason Committee American Council on Education One Dupont Circle Washington, D.C. 20036 (AID/afr-635 GTS)		Food Protein R&D Center Texas A&M University College Station, Texas 77843 (CSD-2804 Res.)	
Or. State	(447)	USDA/ERS	(299), (326), (338)
Office of International Agriculture Oregon State University Corvallis, Oregon 97331 (AID/ta-G-1221 211d)		Economic Research Service U.S. Dept. of Agriculture Washington, D.C. 20250 (RSSA USDA-3-74 GTS) (PASA 276-04-72 GTS) (RSSA 1-74 GTS)	
PAHO	(360), (366)	USDA/FS	(329)-(334)
Pan American Health Organization 525 23rd Street N.W. Washington, D.C. 20037 (AID/ta-C-1225 GTS) (CSD-3557 Res.)		Forest Products Laboratory U.S. Forestry Service Madison, Wisconsin 53705 (PASA TA(AG) 03-75 Res.)	
PCI	(400)	Utah State	(337)
Practical Concepts, Inc. 1730 Rhode Island Avenue, N.W. Washington, D.C. 20036 (AID/otr-C-1377)		Dept. of Agricultural and Irrigation Engineering Utah State University Logan, Utah 84321 (AID/ta-C-1103 Res.)	
Poynor	(352)	Wis.	(318)
Poynor International, Inc. 912 Thayer Avenue Silver Spring, Maryland 20910 (AID/ta-C-1318 GTS)		Dept. of Horticulture University of Wisconsin Madison, Wisconsin 53706 (AID/ta-C-1173 Res.)	

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