

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

1984 Volume 1



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Gainesville, Florida 32611

Office of Agriculture and Office of Rural and Institutional Development, Bureau for Science
and Technology, Agency for International Development, Washington, D.C. 20523

PREFACE

One of the problems facing most Farming Systems Research (FSR) practitioners is the difficulty in locating and accessing relevant FSR literature. The expansion of FSR projects and programs has greatly increased the number of articles, reports, and monographs dealing with particular aspects of FSR. However, few of these documents reach a larger FSR audience. FSR literature is difficult to catalogue in traditional research libraries. The interdisciplinary nature of FSR work makes it difficult, if not impossible, to publish the results in refereed professional research journals. Additionally, much of the FSR literature can be described as "ephemeral" or "fugitive" and consists of trip reports, sections of the annual reports from national programs, and unpublished manuscripts from the many seminars and workshops held on FSR topics. Due to these characteristics, the FSR literature remains largely unavailable, especially to field-level practitioners, who by the nature of their work are stationed in relatively isolated areas. The unavailability of these materials can only slow progress in establishing and developing national FSR programs.

As part of its mandate to support the growth and development of FSR, the Farming Systems Support Project (FSSP) is working to increase the availability of FSR literature. The FSSP is a cooperative agreement between the Science and Technology Bureau of the United States Agency for International Development (A.I.D.) and the University of Florida. Through a subcontract agreement, the Kansas State University (KSU) has been designated the lead institution for the documentation efforts of the FSSP. KSU has developed, with support from its A.I.D. Strengthening Grant, a comprehensive FSR Documentation Center which is housed within its central library facility. Using this as a resource base, KSU manages the annual selection of one hundred key FSR documents for their annotation and publication in a current-awareness, non-cumulative, selective bibliography. Annotation, publication, translation into French and Spanish, and distribution of the bibliography is handled by the Document and Information Handling Facility sponsored by A.I.D.'s Bureau for Program and Policy Coordination/Center for Development Information and Evaluation (CDIE)/Development Information Division.

This is the first volume of the bibliography. Subsequent volumes will be published annually throughout the life of the FSSP. CDIE will catalogue and store all items included in the bibliography series and will be able to provide copies of all uncopyrighted works and, with permission from the publisher, of copyrighted articles. CDIE documentation center and duplicating services will continue after the life of FSSP, thus ensuring that the documents contained in the FSR bibliographies will remain available.

The FSSP is continuing to collect "fugitive" items for future FSR annotated bibliographies. Suggestions for additional documents to be added to the collection can be forwarded to:

Resources on Developing Countries
Libraries
Kansas State University
Manhattan, Kansas 66505
USA

Comments and suggestions on ways to improve the bibliography or documentation effort are also welcome.

USER'S GUIDE TO CITATIONS

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| Item number | 101 | PN-AAK-592 | Document number |
| | | MF \$3.24/PC \$28.47 | Microfiche/ Paper Copy prices |
| Title | Soybean seed quality and stand establishment; proceedings Sinclair, J.B.; Jackobs, J.A. University of Illinois at Urbana-Champaign. College of Agriculture. International Soybean Program (Conference on Soybean Seed Quality and Stand Establishment, Colombo, LK, 25-31 Jan 1981) <i>INTSOY series, no. 22, 1982, xiii, 206 p., En</i> Published by University of Illinois at Urbana-Champaign <i>Grant DAN-1406-G-00-1015-00</i> 93105600 AID/ta-C-1294 | | Serial title and number, date, pagination, and language Publisher |
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| Project number | | | |
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Soybean research has shown that both physical and biological factors are responsible for reduced seed quality and vigor, that stand establishment depends on seed quality, and that seed quality is directly influenced by weather conditions during seed maturation and harvest and by subsequent storage conditions. Because knowledge of these facts remains largely fragmented and is not being communicated to farmers, the International Soybean Program (INTSOY) hosted an international conference in Sri Lanka for research scientists and extensionists to correlate current knowledge on soybean seed quality and stand establishment, discuss ways to communicate this knowledge to farmers, and determine future research needs.

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

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

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

Abstract

To facilitate rapid and accurate processing of your requests for documents from this bibliography, please observe closely the ordering instructions found on the page following the index.

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

001

PN-AAP-094

MF \$3.24/PC \$31.98

Animal production systems in the Eastern Caribbean

Archibald, K.; Singh, R.
Winrock International; University of the West Indies, St. Augustine. Caribbean Agricultural Research and Development Institute
Apr 1981, 220p. : En Consultant report no. 7
5380015

In 1981 the Caribbean Agricultural Research and Development Institute (CARDI) conducted a survey in order to characterize animal production on small farms in the Eastern Caribbean as to resources, constraints, and productivity level, and to identify high priority experimental interventions to improve productivity. Results are herein presented. Seven country reports (St. Kitts-Nevis, Antigua, Montserrat, Dominica, St. Lucia, St. Vincent, Grenada) are followed by a general characterization of animal production systems in the region, and by discussions of economic considerations and of possible interventions in such areas as animal nutrition and health, genetic improvement, animal husbandry, policy and institutional interventions, and farm management.

The authors conclude that insufficient policy-level attention has been given to coordinated parallel development of animal production and crop production. While pricing policies are the major constraint on self-sufficient animal production, other problems (e.g., inadequate processing and marketing facilities and high-priced imported feed) must also be addressed. Appended are a list of specific interventions to improve animal production on small farms and a 35-item bibliography (1975-81).

002

PN-AAP-842

MF \$2.16/PC \$19.76

Integrated crop-livestock-fish farming

ASPAC. Food and Fertilizer Technology Center
(Symposium-Workshop on Integrated Crop-Livestock-Fish Farming, Los Banos, PH, 19-24 Nov 1979)
FFTC book series, no.16, May 1980, 147p. : En

Waste recycling is a key feature of successful integrated crop-livestock-fish farming in the Republic of China, Malaysia, Thailand, and several other Asian countries. The 17 papers included in this volume - the proceedings of a 1979 conference on integrated farming - show the complexity of integrated farming systems in Asia and point out the need to develop systems that are location- and situation-specific.

The first four papers provide an overview of integrated systems in general and of systems having, respectively, crops, fish, or livestock as the major enterprise (prefeasibility studies for these three types of systems are also presented). The remaining papers describe specific integrated systems in Taiwan, the Philippines, Korea, Malaysia, and Japan; included are discussions of an inland fishery, of complex upland farming, of an integrated rice mill and farm complex, and of the utilization of hog wastes through anaerobic fermentation. Several issues emerge as important: analysis of the nature and availability of environmental and socioeconomic resources; new management skills and technologies for specific locations; development of a systematic cooperative marketing scheme through farmers' associations; applied research; and training of

farmers, rural women, government officials, and extension workers.

003

* PN-AAP-652

MF \$2.16/PC \$21.84

Multiple cropping and tropical farming systems

Beets, William C.
1982, xiv, 156p. : Bibliography p.146-152, En
* Westview Press, 5500 Central Ave., Boulder, CO 80301
USA

Well-planned multiple cropping is one of the more feasible ways of raising agricultural production in the tropics, according to this review of the subject. After an introductory explanation of tropical farming systems and multiple cropping, the author lists the types of multiple cropping systems and gives a history of the practice. Discussion is then given to: (1) economic and social factors affecting tropical small farm productivity (levels of technology and resources, farmer managerial ability and traditions, agricultural infrastructure, population pressure, farm size and type, and demand and prices); (2) agro-technical features of multiple cropping systems (crop and variety selection, plant population and spatial arrangements, timing, fertilization, irrigation, erosion, crop management, and mechanization); (3) plant interrelationships and competition; and (4) agro-ecological, biological, and plant physical aspects (climate, soil, light, water, micro-climate, and pests and diseases). Techniques for evaluating the productivity of different cropping systems are analyzed, as are the selection and design of suitable multiple cropping systems in terms of both natural environment and human management. A discussion of research issues, including a survey of current multiple cropping systems research, concludes the study. Included are 56 figures and a 135-item bibliography (1887-1977) of international sources.

004

PN-AAP-105

MF \$1.08/PC \$10.79

Design and management of survey research: a guide for agricultural researchers

Bernsten, Richard H.
1979, ii, 80p. : En

The value of data collected in an agricultural survey depends on following established survey research principles. This booklet outlines these principles and offers practical suggestions to accommodate a wide array of field problems.

Discussion is given to: conducting pre-survey research to determine the survey's purpose; focusing the survey's specific analytical, disciplinary, and data goals; defining the sampling unit and choosing appropriate sampling methods; choosing primary data collection strategies (individual, group, and village interviews, farm recordkeeping); designing, coding, formatting, and pre-testing the questionnaire or interview questions; selecting, training, and supervising hired interviewers; gaining cooperation from villages and farmers; and selecting a data-analysis system. While one-third of the report is devoted to detailed instructions on preparing survey data for computer analysis by SPSS (Statistical Package for the Social Sciences) programs, it also suggests simpler analysis methods (tabular sheets and sorting strips).

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

- 005** **PN-AAP-309**
MF \$1.08/PC \$5.33
- Sistemas integrados de cultivos alimenticios como medio para proveer una dieta adecuada (Integrated systems of food plant cultivation as a means of providing an adequate diet)**
Burgos, Carlos F.
Tropical Agriculture Research and Training Center
1978, iii, 37p. : Es
- A farming systems research (FSR) program undertaken by CATIE to upgrade small farm diets in Central America is described. After briefly defining characteristics of an agroecosystem, the report describes: CATIE's FSR methodology; the relation between farming systems and human nutrition (especially proteins and energy); some nutritional aspects of Central American crops (including corn, beans, and rice); and results of CATIE's surveys of cultivation systems and nutrition in Costa Rica, Nicaragua, and Honduras. A final section outlines a strategy to obtain an adequate diet through crop diversification and intensification; home gardening of crops such as corn or rice which can supply the nutritional elements lacking in the main crop is suggested. Increased livestock production is suggested as an alternative strategy. The need to integrate food technology specialists with agricultural researchers in the entire research process is stressed. Included are 3 figures, 10 tables, and a 45-item bibliography (1949-78).
- 006** *** PN-AAP-344**
MF \$1.08/PC \$12.48
- Course in farming systems research: the Cornell experience**
Casey, Frank; Barker, Randolph
Cornell University. New York State College of Agriculture and Life Sciences
Cornell international agriculture mimeograph, no.93, Jul 1982, 92p. : Bibliography, p.72-92, En
* Program in International Agriculture, 252 Roberts Hall, Cornell University, Ithaca, NY 14853 - single copy free, additional copies 25 cents each
- The development and content of a new course, entitled "Farming Systems Research (FSR) in Developing Countries," first offered at Cornell University during the Fall 1980 semester, are herein described.
- Section I of this report presents the program of a workshop, held at Cornell during the summer of 1980, at which faculty and students examined proposals as to course activities, materials, organization, and teaching methods. Included in the discussion are comments pertaining to the philosophy behind the FSR approach, the nature of inter- and multidisciplinary research, and procedures for conducting field research. Section II provides an outline of the course as given in 1980 and summarizes participants' comments on FSR as a research methodology, as well as on pedagogical issues and course content and mechanics. Section III provides an updated description of the second FSR course (Fall 1981), highlighting specific changes from the original offering, and again including student comments. Reading materials associated with the course are listed in an annex, which includes 16 pages of references (1951-81) divided into methodological readings, bibliographic material, and works on farming systems, cropping systems, and other farm management topics.
- 007** **PN-AAP-980**
MF \$2.16/PC \$14.56
- Network methodology and cropping system research in Indonesia**
Central Research Institute for Agriculture
(Indonesian Cropping Systems Working Group Meeting,
Bogor, ID, 20-21 Jul 1979)
Jul 1979, v.p. : En
- Results in Indonesia of a cropping systems research program begun in South and Southeast Asia in 1965 by the International Rice Research Institute (IRRI) are presented in this collection of papers given at a 7/79 workshop at Indonesia's Central Research Institute for Agriculture (CRIA).
- After an initial paper sketching the program's history, organization, and basic activities, a paper describing activities being undertaken with CRIA to improve the productivity of upland irrigated and lowland rainfed rice farming in Indonesia is presented. Discussion focuses on the selection of specific target areas for research, with attention to selection criteria, site description, and the collection of biological and economic data. Simplified methods and guidelines for designing and testing cropping patterns are presented and are exemplified by a review of systems designed to assess the relative importance of inputs, markets, and farmer technological know-how as production constraints in Indramayu and Lampung. Further aspects of site specificity and of research in Lampung are discussed in three appended papers. Other appendices treat research priorities and economic analyses of simple dispersed trials.
- 008** *** PN-AAP-978**
MF \$3.24/PC \$33.15
- Systems research in the arid zones of Mali: initial results**
Chater, Simon
International Livestock Centre for Africa
ILCA systems study, no. 5, Aug 1981, 251p. : En
* ILCA, P.O. Box 5689, Addis Ababa, Ethiopia
- The two main livestock production systems in Central Mali's arid zones are the agropastoral and pastoral systems, defined respectively by the relative domination of agricultural or livestock production. This report summarizes 5 years of research on two subsystems of these systems - the rainfed millet cropping agropastoral system, and the pastoralism associated with floodplain grazing and farming.
- After a short description of Mali's natural resources, the two subsystems are described in detail. The section on the millet subsystem covers: labor; 1980 crop yields; the village economy; the production and nutrition of livestock (cattle, sheep, and goats); and crop agronomy and improvement, with a focus on cowpea agronomy and millet fertilization. The section on the pastoral system covers rangeland feed resources, livestock production and nutrition, and the problematic social-territorial livestock management framework.
- A final section on future research prospects concludes that the improvements in livestock production systems that are possible given the Sahel's delicate ecological balance, may, although slight, be vital for the survival of these economically important systems. Included are 67 figures, 84 tables, and a 7-page bibliography (1960-81) citing works in French and English.

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009

* PN-AAP-952

MF \$5.40/PC \$61.10

Farm management in peasant agriculture

Collinson, Michael

1983, xxvii, 454p. : Bibliography p.433-444, En

* Westview Press, 5500 Central Ave., Boulder, CO 80301
USA

This book, based primarily on research in Tanzania and elsewhere in East Africa, describes how farm management economics can contribute to the development of traditional African agriculture.

Part I reviews the organization of African peasant agriculture at both the farm and sector levels and then introduces a cost-effective, systems-level approach for the application of farm management economics. The approach evaluates the potential impact of extension program content on the goals, managerial task, and resource productivity embodied in existing small-farm systems. Parts II and III detail methods for implementing this approach. Part II, on the investigation phase, covers: farm classification as a prerequisite to investigation and the accuracy/cost compromise inherent in survey design; a method of building representative farm models which includes control of aggregation bias; detailed descriptions and comparisons of data collection methods for key attributes; and conclusions for survey organization and design, based on different data collection methods. Part III, on planning extension strategy and content, shows how evaluation criteria important to farmers are used in interpreting the results of modeling. Based on the premise that small farmers change their existing systems relatively slowly, the aim is to produce a series of extension programs, compatible with farmers' goals, low cash incomes, and low risk preferences, and with the pressures on their land and labor resources. Included are 109 tables, 7 figures, and a 12-page bibliography (1928-70).

010

* PN-AAM-826

MF \$1.08/PC \$8.97

Farming systems research in Eastern Africa: the experience of CIMMYT and some national agricultural research services, 1976-81

Collinson, Michael P.

Michigan State University, Department of Agricultural Economics

MSU international development paper, no.3, 1982, vi, 61p. :

En

6980444

AID/TA-CA-3

* Free copies available to qualified recipients through MSU
Dept. of Agricultural Economics, East Lansing, MI 48824

The experiences of the International Maize and Wheat Improvement Center (CIMMYT) in efforts to institute farming systems research (FSR) in national agricultural research services in Eastern and Southern Africa over the period 1976-81 are reported.

The author first examines how CIMMYT introduced FSR into Africa via demonstrations which provided research administrators with quick and tangible results for evaluating FSR approaches. A description of FSR procedures focuses on CIMMYT's use of the informal survey (a reprint of which is included), a pivotal and cost-effective technique for diagnosing the farming system. Progress in institutionalizing FSR in national agricultural research services in Kenya, Zambia, Tanzania, and

Zimbabwe is reviewed. Emphasis is placed on: lessons learned in modifying a strongly compartmentalized research network in Kenya and the difficulties junior economists faced in initiating dialogue with senior technical scientists in Kenya; how the Kenyan experience was used to help reorganize and strengthen the agricultural research system in Zambia; and the integral link between FSR and inservice and short-term training workshops.

A concluding section analyzes several issues - FSR as a link between local and national priorities, whether FSR should or should not be prefocused on a single enterprise (such as maize), whether developing countries have adequate research manpower for FSR, and issues pertinent to the further promotion of FSR.

011

PN-AAP-232

MF \$1.08/PC \$2.34

Low cost approach to understanding small farmers

Collinson, Michael P.

Agricultural administration, v.8, 1981, p.433-450 : En

A low-cost, farming systems approach developed by the International Maize and Wheat Improvement Center (CIMMYT) for understanding decisionmaking by small farmers is presented; the method is described as applied to Central Province, Zambia. Basic elements of the CIMMYT approach - grouping farmers into homogeneous populations on the basis of their existing farming systems and evaluating local social and economic circumstances in order to bring to light farm management problems - are described. Details are then outlined for conducting an exploratory survey, i.e., unstructured farmer interviews, to gain a rapid understanding of farming systems and farmer decisionmaking patterns, and for a subsequent formal survey to verify this information, test hypotheses regarding farm management strategies and production techniques, as well as farmer attitudes toward changes in these areas, and examine farmers who have already made such changes. Vital to the entire process is the interaction between biological and social scientists. Detailed suggestions for an exploratory survey, as tested in Zambia, are appended.

012

* PN-AAP-574

PC \$2.08

Planning an adaptive experimental programme on maize for farmers of the Ufipa plateau

Collinson, Michael P.; Croon, S.I.; Mkindi, G.I.

Uyole Agricultural Centre

Nov 1980, 16p. : En

* Microfiche not available - paper copy only

Results of a diagnostic study of the farming systems of Tanzania's Ufipa Plateau, together with suggestions for an experimental research program aimed at helping Ufipa farmers improve management of their increasingly important maize crop, are presented.

After describing labor and land use in the plateau's current farming system, and its major crops, the report examines the rapid changes both in the system and in the constraints to its development which have occurred after 1973 as a result of increasing ox production and the official villagization policy. Stress is laid on the declining importance of labor-intensive

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finger millet cultivation and the correlatively increasing importance of the November–January labor peak. Maize management practices in Ufipa are then quantified, and analysis is made of the way in which maize management decisions are influenced by farmer priorities, resource limitations, and hazards such as the uncertainty of rainfall and crop losses due to insects. The report concludes by proposing an adaptive research program that focuses on testing ways to ease the November–January labor bottleneck, conducting fertility maintenance trials to prolong the use of cleared land, and improving the reliability of maize storage.

013

PN–AAP–364

MF \$1.08/PC \$1.82

Livestock in farming systems research and development programs

De Boer, A.J.

Winrock International. Livestock Research and Training Center; U.S. Agency for International Development. Bureau for Science and Technology. Office of Agriculture (Farming Systems Workshop, Port of Spain, TD, 26–27 Apr 1979)

(1979), (14p.) : En

The majority of animal products consumed within the world's tropical belt are produced on small farms, typically as part of a naturally integrated system of crop/livestock production. This report begins by outlining three stages for study of crop/livestock production before application of a broad-scale development package: analysis of existing crop/livestock production and marketing operations (to explain efficiency parameters of livestock, the rationale for input levels, and the mix of livestock products); definition and quantification of constraints limiting animal production; and on-farm testing of combinations of livestock enterprises and cropping systems. Components of the crop/livestock system are then considered. Discussed in turn are: general measures of efficiency; the multiple uses of livestock; herd structure variables; animal inputs into the cropping system; a model of crop–animal integration in the Caribbean; the construction of feed demand–supply balances; animal feed requirements; classification and nutritional value of feed sources; relationship of feeding to animal genetic qualities; and means of intensifying forage. Modeling and species considerations are discussed briefly.

014

PN–AAG–274

MF \$1.08/PC \$8.19

Handbook on the methodology for an integrated experiment–survey on rice yield constraints

De Datta, Surajit K.; Gomez, K.A.; et al.

International Rice Research Institute

1978, 65p. : En

AID/TA–G–1074

Presented here is a methodology for analyzing constraints to increased rice production in farmers' fields. The methodology, the result of a 4-year multidisciplinary research project to study rice yield constraints by a team of agronomists, economists, and statisticians from the International Rice Research Institute (IRRI) and by 6 cooperating national teams, will give researchers answers to the following questions: (1) What is the

gap between farmers' present yields and the highest potential yield for their fields after predetermined production factors are modified? (2) How much of the yield gap can be attributed to each of the predetermined production factors? (3) What are the differences in costs and returns? (4) How much of the yield gap can be profitably recovered? and (5) If the inputs that are most profitable differ from the actual inputs used by farmers, what personal, social, institutional, or political factors keep farmers from using the most profitable levels? The handbook discusses the selection of study area experimental sites, and factors to be tested (such as fertilizer, weed control, and insect control). Sample survey questionnaires are presented and illustrative analyses are performed on constraint data.

015

PN–AAG–895

MF \$2.16/PC \$25.48

Southern Fulani farming system in Upper Volta: a model for the integration of crop and livestock production in the West African Savannah

Delgado, Christopher L.

University of Michigan

1978, 176p. : En

French edition: PN–AAG–896

AID/REDSO/WA–77–107; AID/AFR–G–1261

This paper provides research results of a study of the Southern Fulani farming system in south-central Upper Volta. Following the Sahelian drought of 1974, donor agency and governmental policy in this area has stressed shifting livestock production from northern to southern and central regions of the country in order to lessen dependence on erratic rainfall patterns. Hypotheses about Fulani society and economic relations which address this strategy are researched and tested by the author. Areas examined include: (1) characteristics of the research site; (2) availability and allocation of labor within an average household; (3) monthly flow of crop and livestock outputs from the average household; and (4) a summary profile of the typical Fulani production unit. The primary conclusion resulting from this research is that the real potential for economic growth through integration of crop and livestock enterprises lies in closer relations between the Fulani and Mossi tribes. The objective of rural development policy should be to promote specialization in crops and small stock by the Mossi, and cattle and small stock by the Fulanis. Recommended policy actions cover 4 major types of interventions: (1) government actions to bolster the cattle–entrusting system; (2) creating a rise in relative returns to herdsmen for maintaining entrusted cattle; (3) actions to move surplus Fulani cattle manure to uses in Mossi market gardening; and (4) improving herder access to purchased food grains. A bibliography of references is provided, along with tables of labor flow data, and samples of questionnaires used in the study.

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016

PN-AAP-595

MF \$2.16/PC \$13.65

Cropping systems in Pespire, Southern Honduras, University of Kentucky, INTSORMIL project: preliminary report number 1

DeWalt, Billie R.; DeWalt, Kathleen M.; et al.
University of Kentucky. College of Agriculture. Agricultural Experiment Station; University of Kentucky. Department of Sociology; University of Kentucky. Department of Anthropology
1st ed. 1982, 103p. : En
9311254
AID/DSAN-G-0149

Data from interviews with 52 male and 72 female household heads in three small communities are used to describe cropping systems, especially for sorghum, in the Pespire region of southern Honduras and ways they can be improved to help the country out of its bleak agricultural situation.

After a general introduction to Honduras and to the southern region, the region of greatest sorghum production, variants of Pespire's two main cropping systems – slash and mulch, and slash and burn (both of which use sorghum and maize, the region's two main crops) – are described, as is the cultivation of secondary crops and of pasture. The report then indicates major production constraints in Pespire and some possible solutions; seed types used in the area are characterized.

The survey showed sorghum to be both a multipurpose and – due to its drought tolerance – an important risk-aversion crop. Key production constraints were identified as bird predation, storage losses (especially to *C. granaria*), locusts, fall army worm, and the eating of seed before it germinates by ants and termites. The survey also revealed that wide adoption of pesticides by farmers augurs well for future technology diffusion efforts.

Two appendices analyze, respectively, the use of sorghum as a human food and changing land use patterns in Honduras and Central America; the latter indicates that increased cattle production is leading to wholesale destruction of forests and a reduction in arable land. Included are 22 tables and a 42-item bibliography (1959–82) of English and Spanish titles.

017

PN-AAP-233

MF \$1.08/PC \$2.34

Economics of systems research

Dillon, John L.
Agricultural systems, v.1, 1976, p.5–22 : En

The systems approach to agriculture, according to this paper, constitutes a new way of viewing the world – one which no longer sees the world in terms of analyzable and mechanistically related parts, but as an interacting and purposive whole. As a corollary, there are important implications for agricultural research and professional research training. In particular, the systems approach has an important role to play in the allocation of research resources because it recognizes that agricultural research is an instrument for achieving higher-level goals (i.e., is not only oriented toward production increases) and it provides a framework both for bringing research alternatives to attention and for their assessment. Use of the systems approach will allow decisionmakers to choose from a variety of alternative research projects, based on systems analysis of their probable outcomes. Moreover, a goal-oriented, systems approach to research management, which has

come to be known as PPB (Planning, Programming and Budgeting) is generally more efficient than is the traditional disciplinary approach. A 39-item bibliography (1967–74) is appended.

018

PN-AAP-683

MF \$2.16/PC \$20.02

Farm management research for small farmer development

Dillon, John L.; Hardaker, J.B.
U.N. Food and Agriculture Organization
FAO agricultural services bulletin, no.41, 1980, x, 145 : En

Methods of conducting farm management research geared to the needs of small farmers in developing countries, particularly those in Asia and the Far East, are presented in this manual.

After an introductory chapter on the need for and approaches to farm management research on small farms, methods of data collection (e.g., farm and village surveys, farm recording schemes, case studies, and experiments) and simple data analysis (including tabular analysis, measures of whole and partial-farm performance, and comparative analyses) are presented. Succeeding chapters outline methods of planning and analyzing whole-farm and partial-farm budgets and cover such topics as activity budgets; farm resource use; farm programming and systems simulation; farm development budgets; and partial profit, gross margin, partial cash flow, parametric, and risk budgeting. Procedures for conducting input-output budget analysis are described (covering estimating benefits and costs, allowing for capital scarcity, marginal analysis of net benefits, etc.), followed by an introduction to the use of production function analysis in farm management research. The final chapter employs decision theory to analyze risk-laden decisionmaking by small farmers.

A glossary of farm management research terms and a subject index are appended; 68 tables and 38 figures illustrate the text. References are included after individual chapters.

019

PN-AAP-161

MF \$3.24/PC \$25.61

Farming systems research at the international agricultural research centers: I – analysis by the TAC review team of farming systems research at CIAT, IITA, ICRISAT and IRRI; II – proceedings of the workshop on farming systems research, Nairobi, May 29–31, 1978

Dillon, John L.; Plucknett, Donald L.; et al.
Consultative Group on International Agricultural Research (Workshop on Farming Systems Research, Nairobi, KE, 29–31 May 1978)
Sep 1978, v.p. : En

Farming systems research (FSR) programs at four international agricultural research centers – the International Center for Tropical Agriculture (CIAT), the International Institute for Tropical Agriculture (IITA), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the International Rice Research Institute (IRRI) – are assessed.

After an introduction to FSR concepts, terminology, goals, and potential benefits, the FSR methodologies employed in

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national FSR programs in Costa Rica and Senegal are analyzed, along with general (baseline data analysis) and special (on-farm and research station) methodological needs. Guidelines for an FSR strategy, including a strategy for balancing on- and off-station work and for cooperation between international centers and national programs, are proposed. FSR programs at the four centers are then assessed both as to their structure and operation and in relation to other center programs. Conclusions and recommendations anent the preceding conclude the report.

Appendices include individual reports on FSR at the four centers, and a 10-page, multi-language bibliography (1959-78). The report also includes proceedings of a May 1978 workshop on FSR held in Nairobi, Kenya, which endorsed the results of the above study.

020

PN-AAP-573

MF \$1.08/PC \$10.14

Annual report to the project: new ways for old worlds: development and research, a new approach to the Ethiopian rangelands development project (third livestock development project)

Ethiopian Cooperative Rangelands Production System Study Programme

Mar 1981, 73p. : En

Development projects must take into account not just technological feasibilities and national-level aims, but also the production system to be developed, and the desires of the society involved. Provided in this paper is a proposal for linking project implementation to systems research in the Ethiopian Rangeland Development Project.

Following brief introductory sections in which the author explains the philosophy underlying the systems research approach to development, the approach itself is outlined, using as an example two Ethiopian pastoral societies - the wild northern Afar or Danakil and the Borana husbandmen of the South. The situation - geography and ecology, external pressures, development options, leadership, and social units - of each society is described. Also included are (1) study models prepared for the two societies outlining questions which need to be answered on nutrition, decisionmaking, herd structure, relationships with neighboring pastoralists and farmers, market offtake, water resources, and technical inputs and (2) information on the level (personnel, specific tasks) at which studies can be initiated. In conclusion, the author suggests that the methods being pioneered in the Ethiopia project may lead the way for complete reorientation of livestock development projects in Africa.

021

PD-AAN-228

MF \$2.16/PC \$13.65

Evaluation of the CARDI/USAID small farm multiple cropping systems research project

Everson, Everett; Beausoleil, Joseph W.; et al.
University of the West Indies, St. Augustine. Caribbean

Agricultural Research and Development Institute
17 Mar-8 Apr 1982, 91p. : En
5380015

Evaluates project to develop recommendations for improved farming systems through farm-based research in the

Eastern Caribbean. Special evaluation covers the period through 4/8/82 and is based on document review, site visits, and interviews with project participants.

Although the project's ambitious objectives have not been fulfilled and many of the expected results not obtained, a sound infrastructure for farm-level applied research and extension has emerged, as farming systems research (FSR) has been readily embraced by farmers and has become the focal point of participating countries' agricultural research programs. Joint country/Caribbean Agricultural Research and Development Institute (CARDI) teams have been established in 7 countries and some 25 farmer cooperators selected on each of the islands. CARDI/FSR staff have become aware of the complex farming systems in the region, a number of production constraints have been discovered, on-farm adaptive problem-solving research has been initiated, and some observation trials conducted. Also, various workshops and seminars have been conducted for research personnel.

Progress has been hampered by a number of implementation problems, however. The project has been spread too thin, geographically, to be effective. Interterritorial communication has been poor and true interdisciplinary interaction among core CARDI personnel not achieved. Overemphasis on data collection and detailed analysis, coupled with a lack of flexibility, has led to a slow cautious approach to field trials. In fact, the project has collected too much data, too rapidly, about a subsample of farmers which represents neither a homogenous group nor a random sample. The project's ad hoc exploratory interventions (7-15 per country) represent constraints identified through informal observation, not during the data analysis process. Thus, to date, project research has added little knowledge about or had little impact on farming systems.

Included in this evaluation are analyses of crop and animal production in the Eastern Caribbean and of CARDI's organizational and functional patterns. Detailed recommendations for Phase II of the project address these and other issues.

022

PN-AAP-234

MF \$1.08/PC \$6.63

Development of plant genotypes for multiple cropping systems

Francis, C.A.

1981, p.179-231 : En

Plant breeding II

Frey, K.J.

Iowa State University Press

The potential for improving multiple cropping systems depends on the researcher's ability to combine genetic advance with new agronomic techniques. Thus concludes this paper, which was presented at a plant breeding symposium held at Iowa State University in 1979.

Emphasis throughout is on intensive cropping systems that combine two or more crops in the field at the same time. Species choice and genetic selection are discussed first; attention is given to the interactions of genotypes in different cropping systems, and statistical alternatives for comparing these interactions. Steps in the practical screening and testing of new cultivars are then outlined: the decision to breed for intercropping systems; phenotypic traits desirable for intercropping (with respect to photoperiod, temperature sensitivity, plant morphology, rooting systems, planting density, and early seedling growth); insect and disease resistance; screening techniques for breeding; and on-farm testing and technology

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transfer. The potential productivity of multiple cropping systems is assessed in terms of competitive ability to use available resources.

A multidisciplinary research focus and improved graduate study are recommended to provide the necessary expertise in genotype development. Comments by symposium panel members and a 136-item bibliography are appended.

023

* PN-AAM-827

MF \$1.08/PC \$7.67

Farming systems research (FSR) in Honduras, 1977-81: a case study

Galt, Daniel L.; Diaz, Alvaro; et al.
Michigan State University. Department of Agricultural Economics

MSU international development working paper, no.1, 1982,

49p. : Bibliography, p.48-49, En

5220139

AID/TA-CA-3

* Free copies available to qualified recipients through MSU Dept. of Agricultural Economics, East Lansing MI 48824

Problems and achievements resulting from the introduction of farming systems research (FSR) into the national agricultural research system in Honduras are examined in this study.

After providing a historical overview of agricultural research in Honduras, the authors discuss the organizational framework for FSR in the country, focusing primarily on the creation of a Central Unit for FSR within the Honduran Ministry of Natural Resource's National Program of Agricultural Research. Next, implementation of the FSR program is addressed, with particular attention to: selection of regions, farmers, and specific problems for on-farm and on-station trials; experiences in implementing farm trials and farm recordkeeping systems; research results and efforts to extend FSR to other regions; and training of Honduran researchers. Key problems - e.g., in introducing FSR to agricultural research personnel, in communicating among the various entities involved, and in obtaining sufficient resources - are described.

It is concluded that while not all of the program's goals were realized, a good deal was achieved in modifying research philosophy and methodology. Recommendations for implementing FSR in other countries are provided. Appended are a 17-item bibliography (1976-81) and comments by FSR researchers.

024

PN-AAK-049

MF \$2.16/PC \$19.24

Farming systems research: a critical appraisal

Gilbert, E.H.; Norman, David W.; Winch, F.E.
Michigan State University. Department of Agricultural Economics

MSU rural development paper, no.6, 1980, 147p. : En

French edition: PN-AAN-029

9311006

AID/TA-CA-3

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

Defining farming systems as human and environmental totalities, the authors of this state-of-the-art study review the literature on FSR, evaluate current FSR programs, and make recommendations to make FSR more responsive to small farmer needs. The political, social, technological, and human components of a farm system are reviewed, and a framework and general description are provided for "downstream" FSR. Unlike "upstream" FSR, which takes place on an institutional level and seeks to generate prototypes to solve deep-seated production constraints, "downstream" FSR is directed at generating, in cooperation with farmers, immediate and site-specific solutions to their needs. Current "upstream" and "downstream" programs at the national (e.g., Columbia, Guatemala, and Senegal) and international levels (e.g., IRRI and ICRISAT) are reviewed, as are several issues affecting the programs' content and focus, including institutional mandates, linkages among research and implementation agencies, professional and practical credibility, efficiency and accountability of research, and constraints of and criteria for improving FSR approaches. Next, the four stages of FSR methodology are detailed: target area description and diagnosis; project or experiment design; testing or implementation; and evaluation and extension. Problems involved in institutional linkages and in FSR training programs are also covered. General conclusions and three concerns regarding FSR (conflicts of private and public interests, gaining sufficient funding, and time to prove FSR's worth) preface the following recommendations: direct future FSR work toward cost/benefit analyses in different ecological zones; develop methodologies to include livestock and societal, environmental, and distributional impacts; and establish more operational linkages between FSR activities and the entire range of agricultural research, planning, and program implementation.

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

025

PN-AAJ-640

MF \$1.08/PC \$6.89

ICTA in Guatemala: the evolution of a new model for agricultural research and development

Gostyla, Lynn; Whyte, William F.
Cornell University. Center for International Studies
Special series on agriculture research and extension, 1980,
53p. : En

Spanish edition: PN-AAP-278

9311137

AID/TA-BMA-8

Agricultural research can have no impact upon small farmers' cultivation practices unless it addresses farmers' real problems and defines efficiency in farmers' terms. Traditional research and development efforts - unilateral flows of initiative and information directed by national planners, executed by technicians through commodity programs, and imposed upon farmers - often result in production techniques that are rejected by small farmers. This report describes the development of Guatemala's Institute of Agricultural Science and Technology (ICTA), which is dedicated to a decentralized research methodology designed to make research programs responsible for the adoption of appropriate agricultural techniques by including the contributions of farmers and social scientists. Under ICTA's interdisciplinary research program, mainly developed by its Socio-Economic Unit (SEU), natural and social scientists sur-

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vey farmers to identify homogeneous groups and their production constraints. The farmers then record their cultivation practices, supplying data about annual crop labor/resource investments. Experimentation with specific treatments, such as agronomic practices or crop varieties, is based on farmer information and the results of controlled tests at production centers. Using the farmers' traditional techniques, an agronomist and farmer test the selected treatments and then apply them to larger areas at different sites. In the next phase, the farmer tests the treatments alone; ICTA personnel visit to record information and conduct evaluations. Problems arose in the initial implementation of this approach, as technicians deprecated farmer input and SEU's low-level regional presence was often erratic. The situation improved as technicians began to realize the benefits of farmer participation and as SEU sent adequate personnel into needed areas. The use of leadership farmers to monitor recordkeeping and test sites also has been helpful. An indication of the obstacles facing those introducing such innovations is provided in the authors' histories of ICTA and SEU, including the latter's conflicts with external and internal proponents of traditional methods and relations with similar institutions.

026

PN-AAP-903

MF \$3.24/PC \$32.76

Interdisciplinary perspective of cropping systems in the Chiang Mai Valley: key questions for research

Gypmantasiri, Phrek; Wiboonpongse, Aree; et al.
University of Chiang Mai. Faculty of Agriculture; Ford Foundation
Jun 1980, xiv, 238p. : En

The past (1969-80) achievements and future prospects of the Multiple Cropping Program (MCP), a multidisciplinary research project being conducted by Chiang Mai University in Northern Thailand's Chiang Mai Valley, are assessed.

Initial chapters describe the Valley's structure (including water supply, cropping intensity, population, infrastructure, and villages); dynamics (seasons, cropping patterns, prices and labor, long-term cropping changes, and crop stresses and perturbations), and farmer decisionmaking processes (as affected by national policy objectives and local needs and constraints). Against this background, the performance and constraints of the MCP systems introduced into the Valley by the University, together with the productivity, stability, and durability of these systems, are assessed. A detailed series of key evaluative questions covering all major areas of the Valley system is posed. Preliminary answers to these questions provide a basis for a concluding outline of research priorities and future directions. It is stressed that the program's comparative advantage lies in its focus on the research questions raised by the evaluation. The text is illustrated by 96 charts, tables, and graphs.

A 75-item bibliography (1962-80) and English and Thai language glossaries of terms are appended.

027

PN-AAP-100

MF \$1.08/PC \$4.03

Methodological issues facing social scientists in on-farm/farming systems research

Harrington, Larry
International Maize and Wheat Improvement Center
(Workshop on Methodological Issues Facing Social Scientists in On-Farm/Farming Systems Research, Mexico City, MX, 1-3 Apr 1980)
17 Nov 1980, 26p. + annex : En

Methodological issues facing social scientists in applied or on-farm farming systems research (FSR) were discussed at a 4/80 workshop held at CIMMYT. Initial discussions of these issues, according to this report on the workshop, focused on the role of the social scientist in FSR and on the usefulness to farmers, policymakers, and experiment stations of on-farm FSR, as well as on the latter's cost-effectiveness. Discussion on the farmer as research client covered the choice of farmer target groups and the appropriate size of recommendation domains; whether to focus on a predetermined commodity rather than the whole farm system (the report recommends the latter when it is technically feasible and there is little hope for improvement in the farmer's main crop); and the general preferability of individual technological components to large technological packages. Discussion on the advantages and disadvantages of various data sources and data collection instruments are summarized, and the wisdom of following the informal survey with a formal survey and of making observations in farmers' fields noted. The report's concluding sections summarize discussions on procedural issues in designing, testing, and evaluating new technologies - including on-farm testing, prescreening, farmer assessments, and analysis of economic impacts - and on integrating social scientists into FSR institutes.

028

PN-AAP-019

MF \$1.08/PC \$3.38

Determinants of agroecosystem structure and function

Hart, Robert D.
(Agricultural Ecosystems - Unifying Concepts, University Park, PA, US, 12 Aug 1982)
12 Aug 1982, 25p. : En

Agroecosystems are determined by both ecological and socioeconomic factors. This paper analyzes how these two types of factors influence farmer decisions in designing and implementing (controlling) a farm management plan.

Several determinants of farmer decisions are enumerated: the natural environment, which affects the agroecosystem either directly (through the availability of energy and material inputs) or indirectly (by triggering farmer decisions); agricultural resources (land, labor, capital, management capability, and farm inputs); the farm household (which mainly affects design decisions); energy and material flows from other agroecosystems; and the ongoing performance of the agroecosystem itself. Specific hypotheses regarding determinant-decision relationships are exemplified from experience in Central America - the relations between temperature and cropping system selections (a design decision) and between the onset of the rainy season and selection of the first crop in a rotation system (a control decision). Concluding sections of the paper discuss the implications of these issues for farming

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systems research and agricultural modeling, as well as for agro- and natural ecosystem research. A 22-item bibliography (1965-82) is appended.

029

* XN-AAL-341-A

MF \$2.16/PC \$24.18

One farm system in Honduras: a case study in farm systems research

Hart, Robert D.

1982, p.59-73 : En

Readings in farming system research and development

Colorado State University

* Westview Press, 5500 Central Ave., Boulder, CO 80301 USA

The conceptualization of a farm system as a set of subsystems with inputs, outputs, and between-system flows can be a valuable tool in cropping systems research. Thus concludes this article, which begins by describing data collected from one farming household in Yojoa, Honduras. Beginning in May 1976, Mr. Aureliano Alvarado, having been selected as a representative farmer, was interviewed weekly over a one-year period. Quantitative interview data were analyzed and from them a qualitative model of a farm system, showing socioeconomic and agro-eco subsystems, their inputs, outputs, and between-systems flows of money, materials, energy, and information, was constructed. This model and the interview data were then used as guidelines in developing methodologies for further cropping systems research at Yojoa. The major findings resulting from this research are described and suggestions for refining the methodology provided.

030

PN-AAP-062

MF \$1.08/PC \$2.08

Using the concept of agroecosystem determinants to link technology transfer and technology generation to form a farming systems research and extension process

Hart, Robert D.

(Role of Crops and Animals in Farming Systems, Columbia, MO, US, 19-20 May 1983)

May 1983, 15p. : En

While farming systems research (FSR) has made a major contribution to agricultural extension, there is still a gap between the information needed for technology transfer and that produced by most FSR projects. In this paper, the concept of agroecosystem determinants is proposed as a framework which can be used to identify the information needed to link FSR with technology transfer.

The author begins by discussing the nature of agroecosystems, and their relationships to farm systems and socioeconomic systems. Farm system decisionmaking is examined next and it is shown that these decisions are based on one or more of the following types of agroecosystem determinants: the ecological and socioeconomic environment; agricultural resources; the household; the performance of the existing agroecosystem; and the flow of materials or energy among agroecosystems. Identification of these decision determinants, it is suggested, can be used by FSR workers to implement a process which links technology generation to technology trans-

fer, by first identifying the type of farm system and of ecological and socioeconomic environment where a new technology is appropriate and then testing its applicability on other farms in other areas. Technology that passes this final test is then communicated to all farms in all areas where it is appropriate.

031

* PN-AAP-617

MF \$2.16/PC \$21.97

Small farm development: understanding and improving farming systems in the humid tropics

Harwood, Richard R.

U.S. Department of Agriculture. International Agricultural Development Service

IADS development-oriented literature series, 1979, xiv, 160p.

: En

* Westview Press, 5500 Central Ave., Boulder, CO 80301 USA

Tropical farming systems are interactions of varied but complementary farm enterprises undertaken with limited resources. This book analyzes ways in which such farming systems can be used to further agricultural development.

Part one presents an overview of tropical small farms and their production systems, with explicit attention to the stages and goals of small farm development and indicators of farmer well-being. The final chapter in this part - the heart of the whole book - suggests a development approach for collaboration among scientists, extensionists, and farmers to develop and extend relevant technology to resource-limited farms.

Part two deals in greater depth with critical but often overlooked factors limiting increased cropping intensity on small farms and describes existing and/or appropriate methods of addressing them. Treated in turn are: physical limitations (water, soil fertility); economic determinants (labor, cash, management capability); resource requirements of multiple cropping; animals in mixed-cropping systems; farmyard and fencerow noncommercial enterprises; soil fertility; efficient resource use; and the need for mechanization. Finally, it is stressed that farmers will only adopt systems that involve minimum risk and maximum stability.

Lists of sources of farming systems information and terminology; botanical names of crops; and an annotated 58-item bibliography (1956-79) are appended.

032

PN-AAP-231

MF \$1.08/PC \$1.30

Combining disciplines in rapid appraisal: the Sondeo approach

Hildebrand, Peter E.

Agricultural administration, v.8, 1981, p.423-432 : En

The Sondeo is a multidisciplinary rapid survey technique developed by the Guatemalan Institute of Agricultural Science and Technology (ICTA) to provide the information needed to orient the work of a technology generating team. A reconnaissance survey team of 10, equally split between socioeconomic and technologists, assesses farmer constraints and technology needs as a basis for agricultural research. Quantified information and questionnaires are not required and the survey lasts only one week. The team investigates farmer conditions in pairs made up of a social

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scientist and a natural scientist. On each of four days the pairing changes. Daily post-survey team discussions are regarded as essential. Each member of the team prepares a report and these are finally amalgamated into one joint report. Experience has shown that combined disciplines can, if well managed, produce incisive and efficient diagnoses of rural conditions and needs and educate the participants in multidisciplinary thinking. (Author abstract, modified)

033

PN-AAP-099

MF \$1.08/PC \$3.38

Generating technology for traditional farmers: a multi-disciplinary methodology

Hildebrand, Peter E.

Agricultural Science and Technology Institute

(Conference on Developing Economies in Agrarian Regions: a Search for Methodology, Bellagio, IT, 4-6 Aug 1976)

Dec 1976, 20p. + appendix : En

The multidisciplinary research methodology of the Guatemalan Institute of Agricultural Science and Technology (ICTA), outlined herein, aims at developing the low-risk technologies needed by traditional small farmers to increase the production of basic grains. The methodology has four components. The first, description and analysis, focuses on informal and formal agro-economic surveys of targeted groups of farmers having common cropping systems. Adaptive research, the second component, consists of two phases - an initial period of experimentation aimed at improving traditional technology in the short run, and a longer process of refining the improved traditional technology. The third component consists of testing and promoting the technology through two types of on-farm trials - farm experiments, financed by ICTA, and farmer tests, financed by farmers themselves. The fourth component evaluates long-range technology adoption through farm records, technician reports, comparative trial records, and followup surveys. A final section of the report describes use of the methodology in various parts of Guatemala - La Maquina on the Coast, the Department of Jutiapa in the southeast, and Chimaltenango in the Western Highlands. A discussion of the role of the social scientist in biological research is appended.

034

PN-AAP-659

MF \$1.08/PC \$2.86

ICTA farm record project with small farmers: four years of experience

Hildebrand, Peter E.

Guatemala. Ministry of Agriculture. Agricultural Public Sector.

Agricultural Institute of Science and Technology

Jul 1979, 16p. + attachments : En

The Institute of Agricultural Science and Technology's (ICTA) crop reporting project in Guatemala is reviewed from its beginning in 1975 as a 3-crop, 40-record project on a 20-ha agrarian reform plot through its development into a nationwide 34-crop, 583-record project.

In the project, which focuses on keeping crop records (as opposed to full-farm records) and so minimizing the time needed for data gathering/analysis and training, data from daily work sheets kept by farmers and from supplemental sheets filled out by ICTA personnel are analyzed to provide detailed tables of inputs, technologies used, crop yields, and prices,

resulting in calculation of gross and net crop incomes. Stress is laid on the importance of close contact between ICTA personnel (at first technicians, but later joined by socioeconomic personnel) and farmers, who are often illiterate, in order to ensure accurate reporting. After suggesting some improvements for the future, the report concludes that the project, which has shown that crop records yield valuable information on technology advances, has been made an integral part of the ICTA program. Demonstration recording forms are included.

035

PN-AAP-095

MF \$1.08/PC \$7.41

Incorporating the social sciences into agricultural research: the formation of a national farm systems research institute: report of a five year tour of duty

Hildebrand, Peter E.

Agricultural Science and Technology Institute; Rockefeller Foundation

Dec 1979, iii, 43p. + 3 appendices : En

Results of a 5-year project aimed at incorporating the social sciences into the Guatemalan Institute of Agricultural Technology's (ICTA) small farm research program are highlighted in this consultant's report.

The report describes the development and use of a social science methodology - based on full-scale agro-economic surveys preceded by preliminary questionnaires (*sondeos*) administered to farmers - aimed at helping ICTA researchers focus their work on small farmer needs and problems; stress is laid on the importance of field activities in La Barranca and Tecpan. A related farm records project is briefly assessed. The use of *sondeos*, the involvement of farmers in technology development, and the conducting of research under conditions relevant to farmers enabled the project to increase the speed and efficiency with which agronomists developed appropriate technology. However, although the social scientists' practices were integrated into many ICTA programs, their long-term role within ICTA is unclear: failure to replace social scientists who leave the Institute, together with the decentralization of the social science unit seems to augur a diminishing impact on ICTA decisions and practices.

A list of 67 project publications, 59 of which are in Spanish, is appended.

036

PN-AAH-977

MF \$2.16/PC \$14.56

Central America: small-farmer cropping systems

Hobgood, Harlan H.; Bazan, Rufo; et al.

U.S. Agency for International Development. Bureau for Program and Policy Coordination. Office of Evaluation

A.I.D. project impact evaluation report, no.14, 1980, 111p. :

En

5960064

Rural development strategies have increasingly focused on extending modern production technology to improve the low yields of small farmers who produce most of the world's food crops. This report evaluates a research project to increase small-farmer production in Central America by developing

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improved cropping practices. The Small Farmer Cropping Systems Project (SFCS) supported research by the Tropical Agriculture Research and Training Center (CATIE) in Costa Rica on the traditional multicropping systems used by over 4 million small farmers in Costa Rica, Nicaragua, Honduras, El Salvador, and Guatemala. Although progress was slow in El Salvador and Guatemala, the project succeeded in implementing on-farm research and developing area-specific recommendations. The major shortcoming of the 5-year project was that it concentrated on the research process itself rather than on verifying and disseminating results. Farmer impact was thus limited to the 75 small farmers on whose farms research was conducted. Farmers in Nicaragua and Guatemala were active participants, whereas those in Costa Rica and Honduras remained largely ignorant of the project and disinterested in adopting alternative systems. Test farm yields increased in every country but Guatemala. CATIE's staff, training, and support capabilities were greatly improved and most national agricultural institutions involved were positively affected. The team concluded that SFCS is a replicable model capable of significantly improving the lot of the small farmer. Recommendations for future projects are: (1) disseminate research results; (2) stress an interdisciplinary approach; (3) seek the active participation of farmers; (4) improve SFCS methodology by upgrading farm selection criteria, clarifying the relationship between on-farm and central station experiments, and increasing attention to the non-agronomic aspects of small farm systems; (5) promote maximum interagency collaboration; and (6) shorten the time lag between research, verification, and dissemination. Appendices on evaluation methodology, project impact on CATIE, and CATIE's production data are included, as are reports on Nicaragua, Guatemala, Honduras, and Costa Rica.

037

PN-AAP-097

MF \$2.16/PC \$16.64

Agricultural research in Honduras

Honduras. Ministry of Natural Resources. National Program for Agricultural Research; International Agricultural Research Service; Honduras. Ministry of Natural Resources
1978, viii, 83p. + 6 appendices : En.

Measures to strengthen the Honduran National Program for Agricultural Research (PNIA) are suggested, based on a review of agriculture's role in the Honduran economy and an assessment of the existing PNIA program.

The authors found that PNIA was characterized by: (1) a program largely restricted to station-based varietal testing and agronomy trials; (2) a network of research stations badly needing improvement; (3) a serious shortage in trained manpower; (4) productive but limited linkages with other foreign and domestic research institutions; and (5) lack of administrative control over the research budget. Suggestions for strengthening agricultural research focus on: reorganization of PNIA into three levels - headquarters, central unit, and regional units, the latter comprised of both farming systems teams and station-based teams; inclusion of an extensionist on each farming systems team; full PNIA control over its research budget; a substantial increase in technical personnel as well as inservice and advanced degree training requirements; and increased and strengthened relations with other research and development institutions. Implementation and funding of these changes are discussed. Appendices include budgetary and staffing data and a report on animal production and research.

038

PN-AAP-096

MF \$1.08/PC \$3.90

Guia metodologica para conduccion de ensayos de finca (Guide to methodology for conducting farm research trials)

Honduras. Ministry of Natural Resources. National Program for Agricultural Research
1979, 22p. + annex : Es

The current (1979) Honduran National Development Plan places top priority on the traditional small and medium farmers who together produce at least 70% of the country's grain. Experience has shown that research in traditional, as distinct from modern, commercial agriculture, must take into account ecological, economic, and technological conditions, as well as limits and possibilities and hence is preferably conducted on-farm rather than at experimental stations. This manual provides a methodological guide for conducting on-farm trials. After an introductory section on problem identification, treatment is given in turn to choice of location, arranging the experiment, site characterization, and data needs at each stage of the farming process. Included are two appendices, one on evaluating weeds, the other on evaluating insects and leaf disease affecting beans, corn, and sorghum.

039

* PN-AAB-810

MF \$6.48/PC \$72.41

International workshop on farming systems (proceedings)

International Crops Research Institute for the Semi-Arid Tropics

(International Workshop on Farming Systems, Hyderabad, IN, 1974)

1974, 556p. : En

AID/TA-G-1073

* ICRISAT, Patancheru P.O., Andhra Pradesh, India 502324

Nearly every aspect of farming in the semi-arid tropics was examined at the workshop, and it was felt that only through the dissemination of information and an integrated systems approach can farming problems be remedied. Toward that end, this report includes the papers presented at the workshop and the discussions following each major group of topics. The first group, Committee I, covered those subjects related to resource assessment and utilization of research on farming systems in the semi-arid tropics. Major attention was given to land, soil, water, climate, and manpower resources for improving production under the rainfed conditions in this seasonally dry area. Committee II examined the crops and cropping systems research needs for the semi-arid tropics, and Committee III discussed the socioeconomic problems related to farming systems research in this area. Finally, Committee IV explored the question of research at cooperating centers and transfer of technology. The group evaluated various ways for the international institutes to play a productive role in the generation of location-specific technology and its transfer to the different agro-climatic and soil regions in the semi-arid tropics.

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

- 040** * PN-AAJ-522
MF \$5.40/PC \$55.38
- Proceedings of the international workshop on socioeconomic constraints to development of semi-arid tropical agriculture**
International Crops Research Institute for the Semi-Arid Tropics
(International Workshop on Socioeconomic Constraints to Development of Semi-arid Tropical Agriculture, Hyderabad, IN, 1979)
1979, x, 435p. : En
9310786
AID/TA-G-1406
* ICRISAT, Patancheru P.O., Andhra Pradesh, India 502324
- New technologies cannot be disseminated in developing countries without an understanding of local socioeconomic conditions. Such is the view adopted by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in sponsoring the International Workshop on Socioeconomic Constraints to Development of Semi-Arid Tropical Agriculture, held February 19-23, 1979 in Hyderabad, India, the proceedings of which are presented in this report. The Workshop's primary aim was to consider ways and means of overcoming the various socioeconomic constraints to agricultural development in the semi-arid tropics (SAT) and emphasis was focused on the role new technologies and/or policies could play in alleviating development constraints in SAT. The subject matter sessions addressed the analysis of existing farming systems and practices, socioeconomic constraints of prospective technologies, field assessment of prospective technologies, issues in foodgrain marketing, the nature and significance of risk, rural labor markets, and the economics of improved animal-drawn implements and mechanization. Among the important observations, it was noted that larger farmers were earlier and more frequent adopters of new technology and that lack of capital is a major constraint to adoption. Research indicates that the sum total of current agricultural policies reduces farm income so that the incentive for increasing cereal production is probably nil. One common recommendation emerging from all sessions was the need to improve the methodological and empirical bases on which policy judgements are made. There is a particular need for data on the importance of risk and uncertainty in determining farmer behavior in SAT regions as well as on labor bottlenecks and on the degree to which new technology constrains labor and affects wage rates. It was also recommended that greater emphasis be placed on understanding the nature of consumer preferences and that policy initiatives in foodgrain marketing consider the economic policies of SAT countries as well as the political situation of both donor and host government agencies. Appended are texts of papers presented in French and lists of country papers and of workshop participants and observers.
- 041** * PN-AAJ-526
MF \$1.08/PC \$10.01
- Planning technologies appropriate to farmers: concepts and procedures**
International Maize and Wheat Improvement Center
1980, 77p. : En
936411101
AID/DSAN-G-0216
* Centro Internacional de Mejoramiento de Maiz y Trigo, Apdo. Postal 6-641, Londres 40, Mexico 6, DF, Mexico
- A key reason preventing farmers in developing countries from adopting fully the technologies recommended to them by researchers and extensionists is the inappropriateness of the technologies themselves. This manual was prepared to present procedures and guidelines to assist agricultural researchers in formulating technologies truly appropriate to farmer needs and is divided into three parts. Part I presents an overview of a research program aimed at developing appropriate technologies. Included are descriptions of on-farm and experimental station research - the key research procedures involved - and the government policy context in which research must occur. It is emphasized that successful research must proceed from knowledge of the farmer's circumstances, that is, the factors, both natural (e.g., climate and soils) and socioeconomic (e.g., farmers' goals, markets, national policy) that affect farmers' decisions on crop technologies. Part II describes procedures for obtaining information on these circumstances, with stress laid on the need to make the process a true collaboration between researchers and farmers. Specific procedures detailed are: gathering and analyzing pertinent background data from government and research reports; conducting an exploratory survey, that is, informal interviews with farmers and other knowledgeable individuals; and conducting a formal survey or questionnaire. Individual chapters discuss questionnaire development, sampling methods, and practical ways to make the survey truly collaborative. In Part III, methods are discussed for gleaned from survey results the information pertinent to planning crop research. In particular, the authors present guidelines for prescreening a few - two or three at most are recommended - "best-bet" technologies for research. A final chapter exemplifies use of these guidelines in two on-farm programs and one on-station program. The authors note that those who think researchers should only go to farmers with finished technologies for demonstration will find this manual less useful than those who support on-farm research. Graphs, charts, and a 25-item glossary of terms are included. Short bibliographies are appended to each chapter.
- 042** * PN-AAG-866
MF \$5.40/PC \$56.42
- Proceedings of the symposium on cropping systems research and development for the Asian rice farmer, IRRI, Los Banos, Philippines, 1976**
International Rice Research Institute
(Symposium on Cropping Systems Research and Development for the Asian Rice Farmer, Los Banos, PH, 1976)
1977, 416p. : En
Funded in part by A.I.D. under CGIAR grant
* IRRI, P.O. Box 933, Manila, Philippines

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

Contains 25 papers and additional discussions from a symposium on cropping systems and development for the Asian rice farmer. The papers present strategies for planning and implementing cropping systems research programs to increase farm income and improve the quality of farm life. Cropping systems research focuses on efforts to increase crop yields, but also concerns itself with the number of crops grown each year, with the goal of increasing food production. The papers are organized into these categories: framework for cropping systems research and development for the Asian rice farmer; physical aspects of cropping pattern design; economics of cropping systems; testing of cropping patterns; component technology including weed science, insect-pest management, and varietal requirements; and cropping systems approach to adaptive research and to production programs.

043

PN-AAN-023

MF \$1.08/PC \$5.20

Limiting factor economic evaluation of cropping systems

Johnston, T.D.

Tropical Agriculture Research and Training Center. Program of Annual Cultivation
1978, viii, 31p. : En, Es

The cropping systems most likely to improve farm family income are those which identify that resource which most limits per ha yields. Since different types of small farmers need different kinds of farming and cropping systems, such information requires a thorough study of the resources, cropping systems, and farming systems of particular groups of farmers and of the social, cultural, agroclimatic, or marketing constraints which dictate the use or avoidance of particular cropping systems. While researchers cannot, of course, develop a system for each farmer, farmer groups can be identified by differences in goals, farming systems, resource mixes, agroclimatic characteristics, etc. Awareness of these differences will enable researchers to design improved systems which make more efficient use of each group's most limiting resource and which thus stand a much better chance of being adopted.

In this study, the methodology for conducting such a limited factor analysis of a small farm is described and exemplified from a study in Costa Rica. Charts measuring total inputs and prices against outputs for each of five cropping systems demonstrate which system produces the highest income for a particular limited resource. (Author abstract, modified)

044

PN-AAG-025

MF \$1.08/PC \$9.23

Polyculture cropping systems; review and analysis

Kass, D.C.

Cornell University

Cornell international agriculture bulletin, no.32, 1978, 72p. :

En

9311194

AID/TA-C-1441

An analysis of the literature indicates that polyculture, or growing two or more useful plants simultaneously in the same area, is generally beneficial. The choice of crops and other environmental variables will determine to a large extent wheth-

er the practice is advantageous in specific situations. In terms of withdrawal of nutrients from the soil, economic return, improvement of the nitrogen status of the soil-plant system when one of the crops is a legume, and greater stability of yields over time, the benefits of polyculture are clear. With regard to ease of harvest and other mechanized operations, polyculture offers some problems but recent research aimed at reducing these difficulties has been surprisingly successful. Certain species and combinations of species appear to perform more successfully in polyculture than do others. Associations of cotton, groundnuts, and maize-legume combinations are commonly used and it is the price relationships of these combinations, rather than the cropping systems themselves, which appear to be the determining factors. The effects of climatic change on polyculture have been well documented, primarily with respect to wet and dry seasons in the tropics rather than year to year variability in the same cropping season. The fact that nutritional requirements and physiology of varieties within a single species may vary more than those of different species has been described in the literature of polyculture. Suggestions for further research are summarized.

045

* PN-AAP-575

PC \$4.55

Overview of mechanization problems in a developing country with special reference to Nigeria

Kaul, R.N.

American Society of Agricultural Engineers

(American Society of Agricultural Engineers, Summer

Meeting, 1982, Madison, WI, 27-30 Jun 1982)

ASAE paper, no.82-5001, Jun 1982, 35p. : En

* Microfiche not available - paper copy only

Farm mechanization problems that occur when developing countries import agricultural machinery are analyzed in this paper, which focuses on problems in Nigeria.

Following background information on the role of farm equipment in general and on different sources of power (manual, animal, and tractor power), the author identifies and discusses four problems associated with importation of agricultural machinery: focus on larger units which often are not economical; lack of appreciation of local cropping systems and of negative effects on women (who must increase their labor in order to harvest and process increased crop outputs); poor performance of imported equipment; and failure to encourage local development and manufacture of equipment. Findings from Nigerian field trials concerning operational constraints on tractors and the performance of crop protection and harvesting equipment are presented. The author concludes that farming systems must be balanced in the technologies they employ; exporters of agricultural machinery should invest in research to modify their product to suit developing country situations. A 27-item bibliography (1962-82) is appended.

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

- 046** * **PN-AAB-723**
MF \$3.24/PC \$28.99
- Field data collection in the social sciences, experiences in Africa and the Middle East**
Kearl, B.E.
Agricultural Development Council, Inc.
(Conference on Field Data Collection in the Social Sciences, Beirut, LB)
1976, 221p. : En
French edition: PN-AAC-817
9310887
AID/CSD-2813
* Agricultural Development Council, Inc., 1290 Avenue of the Americas, New York, NY 10019 USA
- A discussion of research methods – practical field procedures – is presented, based on papers submitted by 20 social scientists from a variety of academic disciplines. Areas covered include: (1) research approaches; (2) familiarization and reconnaissance or baseline studies; (3) considerations in sampling; (4) local support and cooperation; (5) developing and using data collection instruments; (6) problems with specific variables; (7) recruitment and qualifications of interviewers/enumerators; (8) training interviewers and directing their work; (9) interviewing techniques and problems; (10) winning cooperation of respondents; and (11) precoding, and preliminary steps in analysis. Despite its rather formidable format, this publication is intended to be a progress report or a partial contribution rather than a comprehensive reference or text.
- 048** **PN-AAP-660**
MF \$1.08/PC \$6.37
- Basis for planning an adaptive research programme on rice for small farmers in Kyela**
Kirway, T.N.
Uyole Agricultural Centre
Uyole Agricultural Centre research report, no.36, Jun 1982, vi, 42p. : En
- Small farm management in Kyela Plain, Tanzania, is the subject of this study, which was based on interviews with farmers and village leaders and conducted to provide a knowledge base for farming systems research in the area.
- Farming circumstances in Kyela – natural, economic, and institutional – are described first, followed by a discussion of farmers' objectives (primarily subsistence), priorities (staple foods, such as rice, maize, and bananas), and available resources (land, labor, and capital). Findings in these areas are then related to farm management practices – cropping patterns and the crop calendar, soil fertility maintenance, and means of dealing with specific resource limitations such as seasonal labor shortages. The next section identifies hazards faced by farmers (floods, delayed rains, pests and disease) and their strategies for dealing with them, e.g., use of cassava and sweet potatoes as insurance crops, multiple plantings of major crops, and early planting. Finally, suggestions are presented for resolving the labor bottleneck, introducing new cash crops, and improving rice management. Appended is a 10-item bibliography (1952-79).
- 049** **PN-AAQ-008**
MF \$1.08/PC \$6.37
- Demonstrations of an interdisciplinary farming systems approach to planning adaptive agricultural research programmes**
Kenya. Ministry of Agriculture; Egerton College. Department of Economics; International Maize and Wheat Improvement Center
Apr 1977, iii, 41p. : En Report no. 1
- A 1976 project to demonstrate the use of an interdisciplinary farming systems approach in planning adaptive agricultural research in Kenya's Siaya District was the initial effort of the International Maize and Wheat Improvement Center's (CIMMYT) Regional Programme in Economics for Eastern Africa. Results of that planning project are herein presented.
- After providing background information on the CIMMYT program and on procedures to be employed in interdisciplinary research planning, the report examines farmer circumstances in the Siaya District, taking into account the area's climatic and soil conditions, off-farm economic conditions, and land, labor, capital, and farm management factors. Next, the objectives and priorities of Siaya farmers (mainly, reliable food supplies) and the farming system and its development are analyzed, and the importance of deciding on the future of livestock operations is noted. A 5-year maize research program, based on an analysis of key farming systems components (varieties, use of purchased inputs, method of and time of planting, thinning and weeding), is outlined for Siaya areas receiving less than 1,500 mm annual rainfall. Comments on possible improvements in the sequence of research procedures in the Kenya context conclude the report.
- 049** **PN-AAP-103**
MF \$1.08/PC \$4.68
- Screening crop innovations in a whole-farm framework**
Labadan, E.; Bantilan, C.; et al.
International Rice Research Institute
13 Dec 1980, 26p. + appendices : En
- Although researchers frequently use the farmer's field as the unit of analysis when evaluating crop innovations, since methodologies for this are readily available, farmers normally judge new cropping patterns on the basis of their total farm-household operation. This report presents an example of whole-farm analysis of alternatives for new cropping systems at a site in Cagayan Valley in the Philippines.
- The new cropping patterns are evaluated for bio-technical feasibility, profitability, and compatibility with the farming system and with the community's socioeconomic infrastructure. The research site and a 3-component farm planning linear programming model are described. The components include an objective function (farmers' goals), a set of alternative activities (e.g., crop and livestock production), and a set of constraints (e.g., land, labor, and power availability). Three classes of innovations are considered: alternative cropping patterns/technology, institutional credit, and irrigation.
- It is concluded that while whole-farm analysis via linear programming offers considerable analytical power, its field use is limited by its reliance on computers; simpler analysis methods must be sought for use at cropping systems sites. In the example cited, four typical weather occurrences (2 floods, a drought, and a typhoon) affected the analysis. Future planning models should account for environmental realities; a sequentially oriented decision model is recommended. A 27-item bibliography (1961-80) is appended.

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

050

* PN-AAP-542

MF \$4.32/PC \$38.48

Traditional African farming systems in Eastern Nigeria: an analysis of reaction to increasing population pressure

Lagemann, Johannes

IFO - Institute for Economic Research

Afrika-studien, no.98; 1977, xvii, 269p. + attachment : En

* IFO-Institut für Wirtschaftsforschung, Poschingerstrasse 5, 8000 Munich 86, Federal Republic of Germany

To examine changes in land use and farm production as population pressures increase, this study uses data from three Eastern Nigerian villages with markedly differing population densities.

The first section provides a historical review of land use systems in Eastern Nigeria and discusses emerging problems related to population growth. The second, treating farm and household as a unit, analyzes how root crop/oil palm farming systems have changed in relation to changes in land resources. Subsections cover: the resource base; the organization of land use; soil fertility; crop production; yield relationships; the livestock economy; the labor economy; and economic returns and the use of cash income. The analysis shows that farmers react to declining soil fertility and yields by concentrating production on small compounds around the house which receive mulch and manure from household refuse, outlying fields, and land under fallow, and thus have a much higher yield than do extensively used fields. Another finding is that off-farm income increases with population growth. The third and final section assesses a number of proposed strategies for increasing productivity, including: combining upland tree cropping with arable crops; producing wet rice in valley bottoms; and developing a multistoried cropping system near houses. Detailed data and a case study are provided in 13 appendices and a 19-page bibliography (1910-76) is included.

051

PN-AAP-691

MF \$3.24/PC \$33.28

Economics of rainfed rice cultivation in West Africa: the case of the Ivory Coast

Lang, Harald; Kuhn, Frithjof

Socio-economic studies on rural development, no.35, 1979, xiii, 236p. : Bibliography, p.219-236, En

Although rice may be grown in West Africa as either an upland rainfed crop or a lowland irrigated crop, development efforts have emphasized irrigated rice production. This study, focusing on the Ivory Coast, investigates the conditions under which rainfed cultivation in permanent arable farming or ley systems may be more profitable for farmers and feasible on a macroeconomic level.

First, using data from other West African countries, the economics of rainfed rice cultivation at the farm level is analyzed for various cropping methods and different levels of farm mechanization. Two case studies from the Ivory Coast are then presented, examining, respectively, the profitability of traditional and semi-mechanized upland rice production under favorable climatic conditions in the West Ivory Coast and under unfavorable conditions in the Central part of the country. Following this, rainfed and irrigated rice production are compared from a macroeconomic point of view.

The author concludes that since irrigated rice farming requires extensive capital investment, support to rainfed cropping is indicated when the target is a rapid increase in production. Included are 9 appendices providing additional detail and a 17-page bibliography (1935-77), citing works in French, German, and English.

052

* PN-AAP-902

MF \$2.16/PC \$19.76

Report of a meeting of Asian rice-based cropping systems entomologists

Litsinger, J.A.

International Rice Research Institute

(Cropping Systems Working Group Meeting, 11th, Bogor, ID, 18-22 May 1981)

22 May 1981, 151p. : En

* IRRI, P.O. Box 933, Manila, Philippines

The proceedings of a meeting of entomologists from six countries (Indonesia, the Philippines, Thailand, India, Sri Lanka, Bangladesh), this report focuses on methodological issues pertinent to insect control research in rice-based cropping systems.

Presented first is a summary of issues discussed at the meeting, which describes in detail methodologies for developing insect control recommendations and testing various technologies, discusses organizational aspects of cropping systems research, and concludes by recommending establishment of a collaborative project to evaluate the performance of economic thresholds as a basis for insecticide applications. Next, status reports on national programs for entomological cropping systems research in Thailand, Bangladesh, and Indonesia are provided, followed by a paper on farmers' pest control practices at three locations in Yogyakarta Province, Indonesia. A final paper presents a compilation of data sets derived from cropping systems sites in three Philippines provinces.

053

PN-AAJ-081

MF \$1.08/PC \$4.03

Methodology for determining insect control recommendations

Litsinger, J.A.; Lumaban, M.D.; et al.

International Rice Research Institute

IRRI research paper series, no.46, 1980, 31p. : En

936411102

AID/DSAN-G-0083

A cropping systems approach has recently emerged as an effective means of improving insect control - a task which, because of its complexity, high demand on resources, and location-specific nature, has impeded past efforts to produce on-farm yields comparable to those obtained at research stations. This report explains the role of cropping systems research in insect pest control and outlines a methodology for determining insect control recommendations.

Cropping systems research entails specifying a given insect pest control technology by taking into account the cropping patterns of individual farmers, the geographical and temporal distribution of pests, environmental parameters (e.g., rainfall, soil type, landform), cultural practices (e.g., planting, irrigation, and insecticide application methods), farmers' capabilities

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(e.g., resources, beliefs, and customs), and a crop's inherent yield potential. A four-part methodology for using cropping systems data, developed in accordance with the requirements of the Asian Cropping Systems Network of research sites, is presented. The initial stage, description, entails gathering baseline economic and biological data on pests known to farmers, the level of pest control needed, the current status of insect control, and the kinds and levels of technology farmers are willing to adopt. Next, several tentative insect control technology packages compatible with farmers' resources and capabilities are designed. These packages consist of specific insect pest control recommendations - i.e., lists of insects and the insecticides effective against them, resistant varieties, and cultural control methods - pertaining to the entire spectrum of pest problems for each crop within the target area. These alternative packages are then tested for several years at each site. Finally, the costs and returns of the alternative packages are evaluated. The above method, in the authors' opinion, will allow the development of optimal insect control recommendations within 2-3 years, is highly objective, is not costly, and can be carried out by researchers with minimal experience. A 21-item bibliography (1976-79) is appended.

054

PN-AAP-981

MF \$1.08/PC \$7.41

Economic returns to institutional innovations in national agricultural research: on-farm research in IDIAP, Panama

Martinez, Juan Carlos; Sain, Gustavo
International Maize and Wheat Improvement Center
CIMMYT economics program working paper, no.04/83, Apr 1983, 53p. : En

The level and speed of farmer adoption of technologies generated in an on-farm research program undertaken by Panama's Institute of Agricultural Research (IDIAP) in the country's Caisan area are used in this report as a means of assessing the cost-efficiency of the research methodologies employed in the project.

After a lengthy description of the evaluation methodology, results are discussed with regard to the adoption of technological alternatives; the annual flow of net benefits due to the new technology (including yield increases and net benefits per unit of land); and the annual flow of research costs. The benefit-cost ratio and the social rate of return of the research methodologies are then calculated.

Results, which confirm the cost-efficiency of IDIAP's on-farm methodologies as compared to traditional research station methods, show that the lowest rates of return generated by the on-farm research methodology were 118% and 155% (depending on the pricing scenario adopted), a figure increasing to between 194% and 255% in the most likely case of a new flow of social benefits lasting until 1990.

Fourteen tables and a 35-item bibliography (1953-83) are included.

055

PN-AAP-230

MF \$1.08/PC \$4.68

Interaction between cultivation and livestock production in semi-arid Africa

McCown, R.L.; Haaland, G.; De Haan, C.
Ecological studies, v.34, 1979, p.297-332 : En

Low crop yields and a high risk of crop failure have traditionally led farmers in semiarid Africa to rely on domestic grazing animals to supplement their food supply. This paper identifies different types of linkages between cultivation and livestock production and considers the conditions under which each linkage is expected to occur.

Two types of linkages are distinguished - those that obtain when agricultural and livestock production are separated (ecological, competitive, and exchange linkages) and those that obtain when the two are integrated (investment, food, manure, draft, and fodder linkages). Patterns of cropping/livestock production linkages are examined in eight summer rainfall, semiarid African zones (Western Senegal, Bambara and Gourma of Mali, Mossi in Upper Volta, Hausaland in Niger and Nigeria, Bokoro of Mali, Western Darfur in Chad and Sudan, Harar in Ethiopia). Finally, evolutionary trends are discussed to consider what linkages are likely to emerge under different ecological, political, and economic conditions. Appended is a 43-item bibliography (1939-75).

056

PN-AAJ-178

MF \$1.08/PC \$7.28

Guatemala: development of the Institute of Agricultural Science and Technology (ICTA) and its impact on agricultural research and farm productivity

McDermott, James K.; Bathrick, David D.
U.S. Agency for International Development. Bureau for Program and Policy Coordination. Office of Evaluation
A.I.D. project impact evaluation report, no.30, Feb 1982, xiii, 14p. + 5 appendices : En
5200232

In 1975 A.I.D. initiated a project to increase the production and nutritive quality of basic crops in Guatemala and to develop the capability of the Institute for Agricultural Science and Technology (ICTA) to generate and promote the use of improved small farm technology. This report describes the project's setting and activities, outlines its impact, and summarizes its lessons.

Under the ICTA system, new farm-tested seed varieties and cultural practices acceptable to small farmers were developed for maize, beans, and sorghum and led to increased yields and development of a thriving private seed industry. In addition, ICTA staff increased both quantitatively and qualitatively (although rigid government salary schedules have led to a high attrition rate among the 10 Guatemalans who received advanced degrees, threatening ICTA's future progress); benefited from expatriate help in its research work and organizational growth; and received dramatic increases in financial support from the government. ICTA has come to represent a new and innovative model for agricultural research and is now working to share its approach with DIGESA, the Ministry of Agriculture's extension service.

Project experience taught: the benefit of an unconventional approach to generating acceptable small farmer technologies; the importance of sustained USAID/G involvement and of investing simultaneously in human, institutional, and technological resources; A.I.D.'s potential for developing agricultural institutions, its comparative advantage in institution-building projects, and the need in such projects to provide for an institution's support after the project ceases; the productivity of ICTA's linkages to international and U.S. agricultural research centers; the importance of coordinating technology and sociol-

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ogy in small farmer research projects; and the need for special financial incentives to retain ICTA's advanced degree scientists, special feedback information systems to test technology results, and flexibility in project implementation.

Appendices treat the evaluation methodology, ICTA's approach to technology development and farmer acceptance of it, the role of improved seed, and ICTA's institutional development.

057 **PN-AAP-517**
MF \$1.08/PC \$9.88

Integrated crop and animal production: making the most of resources available to small farms in developing countries

McDowell, Robert E.; Hildebrand, Peter E.
Rockefeller Foundation; U.S. Agency for International Development. Bureau for Development Support. Office of Agriculture
(Bellagio Conference, 18-23 Oct 1978)
Jan 1980, 78p. : En

Training institutions and government agencies need to become more aware of the integral and essential role played by animals in small farm systems. So concluded participants at a 10/78 international conference hosted by the Rockefeller Foundation, working papers from which are herein presented.

An initial paper provides a conceptual framework of the different types of farming systems in the developing world (by animal species, dominant crop, main feed resources) as an aid to understanding various crop-livestock relationships. More specific information is given in a paper describing levels of crop-livestock integration within selected systems in Asia, Latin America, and Africa. Each system is discussed in terms of the region's physical features, crops and cropping systems, and the current and possible expanded role of livestock. A case study of a small farm in the western highlands of Guatemala leads to a review of the kinds of problems which have inhibited integrated development of crop and livestock technology: lack of a holistic view; the dominance of Western models of farm systems; emphasis on large-scale farms and productivity; and professional biases (e.g., single commodity stress). Summary conclusions and recommendations conclude the report.

058 **PN-AAP-102**
MF \$1.08/PC \$1.82

Cropping systems research activities in Indonesia

McIntosh, J.L.; Effendi, Suryatna
International Rice Research Institute; Central Research Institute for Agriculture
(Cropping Systems Working Group Meeting, Los Banos, PH, 2-5 Oct 1978)
5 Oct 1978, 14p. : En

Cropping systems research conducted 1973-1978 under the aegis of the Central Research Institute for Agriculture (CRIA) in two rice-producing regions of Indonesia - Indramayu, an irrigated lowland area, and Central Lampung, a rainfed upland area - is profiled.

The Indramayu region, it was found, shows potential for two rice crops plus a supplementary legume crop (preferably soybean) to maintain good soil fertility. Production, however,

has not matched potential due to the unavailability of water in partially irrigated areas and the need for additional power for planting, weeding, and harvesting. The need for a more organized and concentrated production program is also indicated. In Lampung, good rainfall and distribution make year round crop production possible despite low inherent soil fertility, drainage problems, and low pH; limited sources of power and of markets are currently the main production constraints.

A concluding sketch of future activities notes that CRIA efforts will focus on developing rainfed agriculture, in particular on introducing alternative power sources such as animals and mechanization.

059 **PN-AAP-365**
MF \$1.08/PC \$6.63

Prospects for small farm goat production in a transmigration area of Indonesia: results of a survey

Mink, Stephen
Indonesia. Lembaga Pusat Pertania; Princeton University.
Wilson (Woodrow) School of Public and International Affairs; Winrock International. Livestock Research and Training Center; U.S. Agency for International Development. Bureau for Asia. Indonesia
Jan 1983, iv, 46p. : En
AID/DSAN/XII-G-0049

Goat husbandry practices were surveyed in two villages with different agricultural settings in the Way Abung II transmigration project in the Northern Lampung Province of Sumatra, Indonesia, in order to determine the potential for goat production intensification programs in these areas. Results of the survey are presented.

After briefly recounting the history of the area, the report describes the agricultural setting; husbandry of goats, cattle, and chickens; labor use by farm families; crop, livestock, and input markets; and formal and informal credit sources.

The survey revealed that although Way Abung farmers clearly prefer to raise cattle, profitability and especially higher fertility and lower mortality portend a considerable potential for increasing goat production. Constraints to realizing this potential - poverty and lack of cash resources - should be removed in the next several years as a result of clove, fruit tree, and rubber plantation production. Currently, however, vaccinating poultry against Newcastle Disease and increasing the use of cattle in the slack agricultural season are more appropriate than are goat projects in the livestock sector. Goat projects relating to male and female breeding stock and production credit might be initiated. If so, they should include research aimed at increasing high quality fodder on small farms.

060 **PN-AAP-312**
MF \$1.08/PC \$5.46

Algunos sistemas de produccion de cultivos anuales de pequenos agricultores en el istmo centroamericano (Various systems of production of annual crops by small farmers in Central America)

Moreno, Raul A.
Tropical Agriculture Research and Training Center
1979, v, 37p. : Es

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For subsistence farmers, physical and biological factors are most important in determining the production system (i.e., cropping pattern) to be used. This report describes the production systems best suited to the various climatic conditions in Central America.

Precipitation is seen as the most important factor in determining crop combinations in the region. Cropping patterns are outlined first for the humid tropics: for regions without a dry season, those with a short drier period, and those with an identifiable dry season. Similarly, cropping patterns are outlined for "humid dry" regions, those with greater fluctuations in rainfall. In general, small farmers can grow corn, rice, and cassava in the most humid regions, corn and beans under intermediate rainfall, and corn and sorghum in the driest regions. For each region, the sequence of farmers' activities is outlined by calendar dates.

061

PN-AAM-528

MF \$1.08/PC \$4.29

Farming system research approach for small farms of Central America

Moreno, Raul A.; Saunders, Joseph L.
Tropical Agriculture Research and Training Center. Program of Annual Cultivation
1978, 30p. : En

Three integrated farming systems research projects being conducted by the Institute for Tropical Resources (CATIE) to relieve the production constraints facing Central American small farmers are described.

The report first outlines the goals, strategy, and methodology of CATIE's small farmers' cropping systems research project, as well as the design, testing, and evaluation of technological alternatives. Project experiments include testing water and soil conservation practices in El Salvador and Nicaragua and using velvet bean as a cover crop in lowland areas.

Similar information is given for the other two projects - one aimed at using crop byproducts to develop an integrated small farm crop-cattle (milk and beef) production system, and one designed to counteract deforestation by developing alternative production systems that combine agricultural and tree crops, forest plants, and animals. Experiments for the first of these projects include using maize-bean combinations and sweet potatoes as cattle food sources; for the second, simultaneous planting of trees with annual crops and interplanting maize and common beans between rows of fast-growing tree species. A brief note on integrating and extrapolating from research results concludes the report.

062

* PN-AAN-890

MF \$1.08/PC \$3.77

Creating an on-farm research program in Ecuador: the case of INIAP's production research program

Moscardi, Edgardo; Cardoso, Victor H.; et al.
International Maize and Wheat Improvement Center
CIMMYT economics program working paper, no.01/83, Jan
1983, 28p. : En

* International Maize and Wheat Improvement Center,
Londres 40, Apdo. Postal 6-641, Mexico 6, D.F. Mexico

Showing the utility of on-farm research while presenting a model for the administration and organization of such research within a larger program, this report describes the evolution of a new research entity, the Production on Investigation Program (PIP), within Ecuador's National Institute for Agricultural Research (INIAP).

In 1976 INIAP added to experiment station research and regional trials on large farms a third research level, centered directly at the farm level, in order to develop and verify technologies appropriate for the mass of small farmers producing basic foods, such as corn, which had declining or static yields. The essential elements of the research process which emerged, described in detail in this paper, were: (1) delineation of recommendation domains; (2) use of exploratory surveys to identify key farming improvements needed (early maturing varieties, fertilizing, and weed and insect control); (3) on-farm variety, multiple-factor, fertilizer-level, and verification trials; and (4) adjustment of subsequent on-farm and on-station experimentation in terms of findings. PIP, established in 1979 as a means of institutionalizing the on-farm program, is characterized by personnel especially trained in on-farm research living on-site and by strong coordination with other INIAP programs and with extensionists.

063

PN-AAP-104

MF \$1.08/PC \$4.03

Farming systems in St. Lucia: an anthropological perspective

Narendran, Vasantha
University of the West Indies, St. Augustine. Caribbean
Agricultural Research and Development Institute
13 May 1981, 18p. + attachments : En
5380015

Small farmers in St. Lucia employ a heterogeneity of cropping patterns and technologies - including multiple cropping and polyculture, in which four to six crops are planted in vertical and/or horizontal combinations. Using data from an island-wide sample of 31 farmers, this report examines St. Lucia's small farming systems with respect to land tenure, farmer classification, and climate.

First, the island's system of land tenure is analyzed, and it is shown how tenural arrangements - family land, annual leasing, freeholding, or sharecropping - are maximally manipulated by the farming household. It is noted that the various land tenure arrangements have evolved due to limited alternatives and scarce resources (e.g., farm labor, capital, inputs, and farm management) and that fragmentation of land is not as severe a problem as in other developing countries. Next, St. Lucia's system of farm agriculture and differences in level of farming by category of farmer (e.g., commercial, semi-commercial) are assessed. Crop differences by climatic zone are described; while various cropping patterns are identified, it is noted that each farmer in the sample seems to have developed his/her own unique system. A concluding section identifies key constraints on increased food production.

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064

* PN-AAP-414

PC \$2.86

CATIE's small farmers oriented agricultural research effort in the Central American Isthmus

Navarro, Luis A.

Tropical Agriculture Research and Training Center; U.S.

Agency for International Development. Bureau for Development Support. Office of Agriculture

(Consultation Meeting on Natural Resources Management for Food and Agricultural Production through Farming Systems adapted to Ecological and Socio-economic Conditions of Small Farmers in the Caribbean Region, Kingston, JA, Jun 1980)

Jun 1980, 22p. : En

5960064

* Microfiche not available

CATIE's small farm research program in Central America - called the Annual Crops Program - is described. After outlining CATIE's mandate, goals, and action framework, the report discusses the four stages of the program's research methodology - description of the current farming system, design and testing of new technology, validation of the most promising technologies, and extension of those found optimal. Initial and yearly activities of the research team are briefly recounted, and the benefits of multidisciplinary research and of institutional interaction and cooperation discussed. Findings and results of the Annual Crops Program are presented, showing changes in technical and economic indices for on-farm cropping system experiments in Costa Rica, Honduras, Nicaragua, and El Salvador. The paper concludes with descriptions of other CATIE research programs (e.g., the Cattle and Small Farm Animal Program) and of the types of training CATIE provides.

A bibliography (1976-79) of 24 titles, 16 in Spanish, is appended.

065

PN-AAK-475

MF \$1.08/PC \$4.55

Farming systems approach: relevancy for the small farmer

Norman, David W.

Michigan State University. Department of Agricultural Economics; U.S. Agency for International Development.

Bureau for Development Support. Office of Rural Development and Development Administration

MSU rural development paper, no.5, 1980, vi, 26p. : En

French edition: PN-AAN-207

9311190

AID/TA-BMA-4

Farming systems research (FSR) is a "bottom-up" or farm-level approach to the development of small farmer technologies. This paper defines the basic characteristics of FSR, gives examples of successful FSR projects, and discusses problems in implementing FSR.

Conventional agricultural technology development tries to modify technical farming elements but ignores human factors. FSR, on the other hand; recognizes and focuses on the interrelationships between technical and human elements in a farming system. Its primary aim is to increase productivity in a way that is acceptable to the farming family. FSR gives the small farmer, often for the first time, a voice in tailoring research

priorities. Farmers and multidisciplinary teams work together to design, modify, and improve farming systems in a local area.

Although agricultural scientists for years have disdained mixed cropping, an FSR project in northern Nigeria showed that mixed cropping was an efficient strategy for farmers facing land or labor constraints or uncertain weather. In northern Nigeria, a FSR cotton project succeeded after farmers rejected a university-designed cotton planting technology package because its labor demands were incompatible with their farming systems. An FSR project in Southeast Asia led to a dramatic increase in cropping intensity in only 4 years while in Guatemala an FSR-revised planting system increased farmers' income by 33%.

However, FSR is still in a developmental stage and faces numerous problems, including the short supply of researchers capable of understanding and working with small farmers in developing countries; the lack of a standard methodology; and the time demands and expense of its area-specific approach. To overcome these problems, FSR should: expand its systems approach to include marketing and off-farm enterprises; strengthen links to extension agencies in order to reduce time lags between recommendation and adoption of solutions; and develop more widely applicable technology packages. Also, if a working environment more favorable to FSR is to be created, agricultural institutions and scientists will have to take a more holistic approach and be more willing to interact with farmers and extension workers. A list of 28 references (1972-79) is provided.

066

PN-AAG-951

MF \$2.16/PC \$18.85

Technical change and the small farmer in Hausaland, northern Nigeria

Norman, David W.; Pryor, D.H.; Gibbs, C.J.

Michigan State University. Department of Agricultural Economics

African rural economy program: working paper, no.21, 1979,

141p. : En

6250926

AID/AFR-C-1260

As an indirect recipient of Ford Foundation grant funds in 1964 and of subsequent funding from the Ahmadu Bello University, the Institute of Agricultural Research and Special Services has undertaken a four-phase social science research program to study the economics, profitability, improvement, and implementation of small farming in Hausaland. Reporting on only a small portion of this total program, this paper presents a comparative analysis of the economics of traditional small-farm agriculture in Sokoto, Zaria, and Bauchi, three areas in Hausaland; assesses the profitability and relevance of improved technological packages for cotton, sorghum, and maize; and discusses the implications of the results for research workers and policymakers in Hausaland and in the Sahelian countries with a similar ecological base. Following a very brief discussion of the farming system and of Hausaland proper, the methodology for the selection of villages and farm families for study is outlined. A description of the method of data collection is also included in this section. So that study results are presented in an orderly manner, the next three sections concern traditional farming in the Hausa region, comparative analysis of traditional farming in the Sokoto, Zaria, and Bauchi areas, and an analysis of improved technology packages in Daudawa village in the Zaria area. Traditional farming in Hausa is discussed in terms of land, labor and labor concentra-

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tions, capital, cash production costs, land and labor relationships, cropping systems, and income. The following factors are applied to the comparison of traditional farming in the three study areas: effect of population density on farming; effect of climate on farming; self-sufficiency and incomes among areas; influence of cattle ownership; the changing family structure; and influence of access to urban areas. The analysis of improved technology packages is described by their compatibility with technical elements (land types, water), with endogenous factors (return per unit of land, and return per unit of labor), and with exogenous factors (market accessibility, credit, fertilizer distribution). Finally, a section containing a summary and implications for consideration by the policymaker includes the concluding statement, which is also the premise of this paper: that sound development of farming systems must build upon, rather than destroy, the farmer's traditional techniques. A reference list of 110 entries (1955-1978) and a table of the Gini coefficient on distribution of land by village are appended to the paper.

067

* PN-AAP-478

MF \$3.24/PC \$37.57

Farming systems in the Nigerian Savanna: research and strategies for development

Norman, David W.; Simmons, Emmy B.; Hays, Henry M.
1982, xxiv, 275p. : En

* Westview Press, 5500 Central Ave., Boulder, CO 80301
USA

Presenting the case for a farming systems approach to research in developing countries, this book considers the role of new technology and appropriate development strategies in improving agricultural production and the welfare of farming families in the semiarid tropical region of West Africa. The authors draw extensively on comprehensive studies they and their associates conducted over an 11-year period in northern Nigeria. Their discussion of these studies, which focused on production, consumption, and marketing systems and included the testing of improved technology packages, is supplemented by results of research conducted in other parts of semiarid West Africa. Emphasizing the importance of a proper understanding of the technical and human environment in which farming families operate, they describe the essential characteristics of a farming systems approach and consider methodological and implementation problems that must be solved if it is to become a widely accepted development strategy in the 1980's.

Appended are a 20-page bibliography (1951-81) and author and subject indexes; 41 tables, 16 figures, and 3 maps illustrate the text. (Author abstract, modified)

068

* PN-AAP-377

MF \$3.24/PC \$37.05

Annual cropping systems in the tropics: an introduction

Norman, M.J.
University of Florida
1979, x, 276p. : En

* University Presses of FL, 15 N.W. 15th St., Gainesville, FL
32603 USA

A short course was developed in 1971 at the University of Sydney, Australia, on the basic biological and physical principles of tropical farming systems. This textbook was developed from the course to serve as an introduction to annual cropping systems, particularly in Africa and Asia.

A farming system is first described, with specific reference to resource patterns and uses, farming system typology, and tropical climates and soils. Next, background information on hydrology, energy, biogeochemistry, and socioeconomic in tropical farming systems is provided. These same four factors are then discussed with reference to the following specific types of annual cropping: shifting cultivation, semi-intensive and intensive rainfed cultivation, and irrigated cultivation. Mixed systems of annual and perennial crops are viewed from the same aspects.

The final two chapters describe, respectively, the role of livestock in annual cropping systems and the elements of tropical farming systems research: its meaning, objectives, and components. Included are evaluations of established farming systems, of environments, and of the transfer of new technology. References follow each chapter.

069

PN-AAP-977

MF \$1.08/PC \$11.31

Cropping systems and related research in Africa

Okigbo, Bede N.

Association for the Advancement of Agricultural Sciences in Africa

Occasional publication series OT, no. 1, Apr 1978, 81p. : En

Published information on African cropping systems and related topics is synthesized in this report.

After describing Africa's physical characteristics, its farming and cropping systems, and the crop combinations and spatial arrangements in traditional African cropping systems, the author surveys cropping systems and practices in the countries of West, Central, Southern, East, and North Africa. Research on African intercropping systems is then reviewed and the advantages and disadvantages of intercropping are summarized. Guidelines for research on crop combinations, discussions of its scope, and, briefly, of the need for standardized experimental techniques and terminology, conclude the report.

The text is illustrated with 44 charts, tables, and maps. Appendices include lists of cropping system terms, classifications of African farming systems, and a bibliography of 105 items (1933-77).

070

PN-AAP-576

MF \$1.08/PC \$2.47

Nutritional criteria in plant breeding: technical problems and constraints in relation to Sri Lanka's plant breeding programme

Pain, Adam

University of East Anglia. School of Development Studies
UEA discussion paper, no.122, Feb 1983, 17p. : En

Plant breeding literature has largely been concerned with analyzing the products of plant breeding and with redirecting research from simple yield objectives to broader considerations such as crop stability and disease and pest resistance, while for the most part neglecting to examine the use of nutritional

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criteria to determine research priorities. This paper, using Sri Lanka's plant breeding program as an example, explores nutritional criteria for plant breeding, and, in particular, technical problems that have frustrated breeders.

The Sri Lanka program shows that strategies for nutritional improvement encompass far more than just concerns as to the protein profiles of individual crop species and that issues such as pricing policies, subsidies, and distribution mechanisms should inform and direct nutritional programs. Moreover, the fact that nutritionists have clearly stated that crop protein values are not below safe levels for human intake should lead plant breeders to refocus their attention toward carbohydrates and toward the neglected area of improving the oil content of food species. Unfortunately, there is little evidence that this is taking place. Appended is a 23-item bibliography (1966-80). (Author abstract, modified)

071

PN-AAE-446

MF \$1.08/PC \$7.28

From agronomic data to farmer recommendations: an economics training manual

Perrin, R.K.; Winkelmann, Donald L.; et al.
International Maize and Wheat Improvement Center
Information bulletin, no.27, 1976, 52p. : En
AID/TA-G-1083

The quality of recommendations that agronomists make to farmers depends upon how carefully the agronomist has considered all of the factors relevant to the farmers' situation and goals. Some of those factors may not be evident to the agronomist. This manual shows agronomists how to develop recommendations suited to the farmer's desire to increase his average income, avoid risks, and, if possible, avoid investing in additional capital equipment. A good farm recommendation can be defined as a choice the farmer himself would make if he had all of the agronomic information available to the agronomist. Successful farm recommendations must be based on agronomic data that fit the farmer's agronomic conditions or the farmer will not obtain the predicted results. Because it is impossible to conduct experiments on each farm and then make recommendations tailored to each farm, the agronomist must define a target group of farmers, conduct experiments under conditions representative of their farms, and make recommendations applicable to the entire group. This manual assumes that farmers think in terms of net benefits as they make decisions. Illustrative examples of this decision process are discussed. The two main problems in evaluating agronomic alternatives in terms of their net benefits are (1) estimating the relative weights the farmers place on various kinds of goods, and (2) estimating the effect of uncertainty on farmers' decisions about net benefits. The process of deriving recommendations is discussed in detail.

072

PN-AAP-778

MF \$1.08/PC \$9.36

Proceedings: farming systems seminar-workshop, March 16 -18, 1981, PCARR, Los Banos, Laguna

Philippines. Ministry of Agriculture. National Science and Technology Authority. Philippines Council for Agriculture and Resources Research and Development.
(Farming Systems Seminar-Workshop, Los Banos, PH, 16-18 Mar 1981)
1981, iii, 68p. : En

To develop a methodology for disseminating farming systems research (FSR) information to farmers on the use of technology packages developed by research and agricultural institutions, an FSR workshop was held in Los Banos, Philippines in 3/81. The workshop's proceedings are presented in this report.

The report provides, in whole or part, the text of eight workshop papers on the following FSR topics: Central Luzon State University's Technology Packaging Project and 1980-81 results of its integrated model farm; the cropping systems approach employed in the Capiz settlement area; the Farm Systems Development Corporation's experiences with irrigation-based farming systems; results of the University of the Philippines at Los Banos's Integrated Rural and Agricultural Development Program; a review of FSR types and methodologies; the experiences of the Inter-Asia Cropping Systems Network; and the Benchmark Soils Project conducted by the Universities of Hawaii and Puerto Rico. Also included is a workshop discussion of the role played by social scientists in developing FSR technology and reports of workshop groups in the areas of technology generation, verification, and dissemination.

073

* PN-AAP-843

MF \$4.32/PC \$49.92

Vegetable farming systems in China: report of the visit of the vegetable farming systems delegation to China

Plucknett, Donald L.; Beemer, Halsey L. Jr.
Westview special studies in agricultural science and policy,
1981, xi, 386p. : En
* Westview Press, 5500 Central Ave., Boulder, CO 80301
USA

Agricultural modernization in mainland China has focused on vegetable production, which is carried out largely by hand and focuses on meeting the needs of city dwellers. This report presents the findings of a U.S. agricultural team on vegetable farming systems being used in China's northeast and southeast regions, the country's two major suburban vegetable producing areas.

Chapters in Part I treat vegetable production in terms of land and water resources management, fertilizer (organic and inorganic) production and use, vegetable cropping systems, environmental control structures, plant protection, and weed control. In Part II, discussion is given to research and extension and to three agricultural support services - plant breeding programs, vegetable seed production and maintenance, and vegetable storage and preservation. The final section focuses on the planning, organization, price determination, and marketing structure of China's urban vegetable supply.

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Appended are a description of the institutions visited by the team, a study of pig raising in China, and several tables of supporting data.

074 **PN-AAJ-280**
MF \$3.24/PC \$34.45

Integrated agriculture-aquaculture farming systems

Pullin, S.V.; Shehadeh, Z.H.
International Center for Living Aquatic Resources Management
(ICLARM-SEARCA Conference on Integrated Agriculture-Aquaculture Farming Systems, Manila, PH, 6-9 Aug 1979)
1980, 265p. : En
ICLARM conference proceedings, no.4
9311050
AID/DSAN-G-0178

Although integrated agriculture - aquaculture (IAA) farming has been practiced in Asia for centuries and offers efficient resource utilization, reduces risk by diversifying crops, and provides additional food and income, reliable quantitative production and management guidelines have yet to be produced and disseminated for use as a basis for development programs. This report on the proceedings of the Fourth International Center for Living Aquatic Resources Management Conference (ICLARM 4) addresses this need. The conference was held 6 - 9 August 1979 in Manila, Philippines and was co - sponsored by ICLARM and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture. The conference's goals were to: (1) provide an overview of current IAA farming practices in selected Asian countries; (2) increase awareness of IAA's ability to raise farm income; (3) review available experience and technology; (4) discuss IAA's socioeconomic aspects in order to identify research and development priorities; and (5) encourage governments and international donors to initiate IAA research and development projects. The report consists of 24 papers, 10 of which review broad strategies, techniques, and problems associated with IAA, such as aquaculture in rice fields and irrigation systems; the role of pesticides and health as constraining factors; and the use of animal wastes in pond management. The other 13 papers were presented as case studies on current IAA practices in Hong Kong, Hungary, India, Indonesia, Japan, Malaysia, Nepal, the Philippines, Taiwan, and Thailand. A final paper highlights the needs for research on both IAA farming systems in general and on the major factors affecting IAA performance - energy, materials, space, time, and information. Many of the papers are detailed studies, supported by charts, data, pictures, diagrams, and maps; and most are referenced with bibliographies on sources of information on IAA. A list of the authors and of the conference participants is appended.

075 **PN-AAP-648**
MF \$2.16/PC \$21.45

Socioeconomic constraints to the production, distribution and consumption of sorghum, millet and cash crops in North Kordofan, Sudan: aspects of agricultural production, the household economy, and marketing

Reeves, Edward B.; Frankenberger, Timothy
University of Kentucky. College of Agriculture. Agricultural Experiment Station; University of Kentucky. Department of Sociology; University of Kentucky. Department of Anthropology
Farming systems research in North Kordofan, Sudan: report, no.2, Nov 1982, xi, 151p. : En
9311254
AID/DSAN-G-0149

Its goal to identify socioeconomic constraints impeding agricultural production and marketing in the el-Obeid area of Kordofan, Sudan by analyzing relationships between subsistence (sorghum and millet) and cash (primarily groundnuts and sesame) crops, this is the second of two farming systems research reports written during the course of field investigation in 15 villages.

Part I, on household economy and agricultural production, presents detailed data on crops, land tenure and land use, cultivation practices, and methods to reduce risk and labor inputs, using findings from a preliminary survey of 40 farm households in 3 villages. Part II, based on data on sellers, buyers, and marketing channels collected at four marketing centers of varying size and character, describes major aspects of crop and livestock marketing. Part III is an analysis of the main constraints to agriculture in the area (environmental; access to seeds, water, and labor; credit and pricing; technical knowledge; and transport and storage), how farmers presently deal with these constraints, and what strategies they could implement in the future. Eleven appendices provide additional data (on, e.g., harvesting procedures, food preparation, consumption patterns) not easily reviewed in the main body of the report plus a copy of the survey questionnaire.

076 **PN-AAN-964**
MF \$1.08/PC \$5.07

Art of the informal agricultural survey

Rhoades, Robert E.
International Potato Center
Mar 1982, 40p. : En Social Science Dept. Training Document no.1982-2

If properly conducted, informal agricultural surveys can provide valuable data on local farming ecology and practices. Presented here is a manual on conducting informal surveys of farmers in developing countries.

Instructions are provided for: (1) pre-fieldwork activities, such as a literature review and the use of aerial photos and maps to delineate the geographical area to be studied; (2) interviewing farmers (approach, warm-up, dialogue, departure, and recording of information); (3) informally organizing data by type of farmer and cropping system; (4) studying agroecological zones through the use of field plotting and transects; (5) initial quantification of data; and (6) writing a summary report of findings. Appended are results of an informal survey conducted

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in Canete, Peru, and a guide for an informal survey of a potato producing region.

077

PN-AAP-101

MF \$1.08/PC \$2.08

Manual de actividades de capacitacion en servicio (Manual of inservice training activities)

Rosales, Franklin E.

Honduras. Secretaria de Recursos Naturales. Programa

Nacional de Investigacion Agropecuaria

1980, 12p. : Es

Drawn from the experience of Honduras' Central Agricultural Research Unit, this inservice training manual has six sections. The introduction reviews changes in the agricultural research program (1977-80) and the new structure of the program. A section on inservice training objectives explains that, in general, new technicians in the research program are to receive preparation for close contact with the farmer and for study of integrated systems, and specifically to: analyze and identify agricultural production problems; set priorities; conduct farm trials; communicate with farmers; analyze and transmit technical information; apply basic knowledge; and work as a team. Next, a section on methodology and organization outlines the training, which continues for 9 months in Comayagua, with 75% of time spent in practice, 25% on theory. Practical activities (section 4) are divided into the following: diagnosis; farm trials; farm plots; farm assessment; precipitation measurement; and field days. Theoretical activities (section 5) include 11 short courses, 10 lectures, 8 workshops, 10 seminars, and readings and consultation with supervisors. Finally, the evaluation of trainee performance is discussed with regard to theory, spoken and written communication, field work, and responsibility.

078

* PN-AAP-608

MF \$4.32/PC \$44.72

Farming systems in the tropics

Ruthenberg, Hans

1971, xiv, 313p. : En

* Oxford University Press, 16-00 Pollitt Dr., Fair Lawn, NJ 07410 USA

A course consisting of lectures on the characteristics of tropical farming systems for undergraduate and graduate students at Gottingen and Stuttgart-Hohenheim Universities was the basis for this book, intended to familiarize the agricultural development worker with the various types of farming he/she will encounter, and with management problems arising in particular farming systems.

Tropical agriculture is discussed from an agro-economic perspective, with emphasis on farm management aspects and particularly on the interactions between technical and economic aspects of farming. An initial chapter covers general characteristics of tropical farming. Succeeding chapters, organized as to type and intensity of land use, discuss the following types of cultivation systems: shifting cultivation; semi-permanent; regulated ley farming (when grass is allowed to grow for grazing on land that has carried crops); permanent cultivation on rainfed land; arable irrigation farming; perennial crops; and grazing (total nomadism, semi-nomadism, and ranching). In each chap-

ter; weaknesses of the particular cultivation system are delineated and suggestions for development are made. Numerous case studies (most from Africa or Asia) are provided and a 15-page bibliography (1878-1970) is appended.

079

* PN-AAP-653

MF \$3.24/PC \$30.55

Development of smallholder vegetable production in Kigezi, Uganda

Scherer, Friede

IFO - Institute for Economic Research

IFO forschungsberichte der Afrika-studienstelle, no.23, 1969,

x, 217p. : Bibliography, p.214-217, En

* IFO-Institut fur Wirtschaftsforschung, Poschingerstrasse 5, 8000 Munich 86, Federal Republic of Germany

Searching for urgently needed cash crops, smallholders in Uganda's Kigezi District accepted in 1951 a government proposal to produce vegetables of European origin despite unfavorable marketing conditions, according to this study of the program.

After a lengthy introductory section on Kigezi's characteristics and history and on the production, marketing, and organizational preconditions for vegetable growing, the establishment of the Kigezi vegetable growing industry and its transformation from a private to a cooperative enterprise is reviewed. This is followed by descriptions of: extension, cultivation, yield, and cost aspects of vegetable production; the organization of growers; and present and future marketing prospects. A final section reviews the program's effects on the Kigezi District as a whole, on the cooperative societies, and on farm returns. The program's positive results, it is concluded, show that producer interest and dependence on a crop can overcome disadvantageous factors; that the African smallholder can adapt to new situations relatively quickly if he trusts the project; and that cooperatives can, under the right conditions, play an important role in marketing.

080

* PN-AAL-237

MF \$4.32/PC \$50.96

Farming systems research and development; guidelines for developing countries

Shaner, Willis W.; Philipp, P.F.; Schmehl, W.R.

Consortium for International Development; U.S. Agency for International Development. Bureau for Science and Technology. Office of Agriculture

Westview special studies in agriculture/aquaculture, Sep

1981, xiv, 414p. : En

9311006

AID/DSAN-C-0054

* Westview Press, 5500 Central Ave., Boulder, CO 80301 USA

Farming systems research and development (FSR&D) is an approach that is being used increasingly to meet the need for greater food production and a better standard of living for small-scale farmers in developing countries. This book synthesizes the FSR&D procedures used by national governments and international research centers around the world, emphasizing methodologies that have proved successful in practice.

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The authors describe the characteristics and objectives of FSR&D, then present information on selecting target and research areas, problem identification and development of a research base, research design, on-farm research, extending research results, and implementation and training procedures. They emphasize that the FSR&D approach requires a clear understanding of farmers and their families, farmers' conditions, and governmental staffing and organizational capabilities, and in one chapter discuss how to determine whether an FSR&D approach is in a particular country's best interests. Appendices present detailed examples of procedures described in the text, covering a variety of countries with different cropping and livestock systems, environmental conditions, and research and development capabilities. (Author abstract)

081

* PN-AAL-341

MF \$2.16/PC \$24.18

Readings in farming systems research and development

Shaner, Willis W.; Philipp, P.F.; Schmehl, W.R.
U.S. Agency for International Development. Bureau for Science and Technology. Office of Agriculture
Westview special studies in agriculture/aquaculture science and policy, 1982, xiii, 175p. : En

9311006

AID/DSAN-C-0054

* Westview Press, 5500 Central Ave., Boulder, CO 80301 USA

Farming systems research and development (FSR&D) views the farm as a system and focuses on how interdependent components under the farm household's control interact with physical, biological, and socioeconomic factors outside the farmer's control. This monograph contains nine readings presented before a 1979 workshop by some of the leading practitioners in FSR&D.

The first paper categorizes farming systems according to their stage of development and resource use, while the second conceptualizes FSR&D and raises several methodological issues. Successive papers outline and discuss the FSR&D experience and approaches of the International Maize and Wheat Improvement Center, the International Rice Research Institute, the Agricultural Science and Technology Institute of Guatemala, and the International Crops Research Institute for the Semi-Arid Tropics. Two papers discuss FSR&D as applied to a small farm in Honduras and cropping systems research in Indonesia, respectively. Stressed are the importance of on-farm research, interdisciplinary teamwork, the search for practical solutions to farmers' problems, and better use of available data. A subject index is included.

082

* PN-AAP-410

MF \$4.32/PC \$41.21

Proceedings of Kansas State University's 1982 farming systems research symposium - farming systems in the field

Flora, Cornelia B.
Kansas State University. Office of International Agriculture Programs
(Farming Systems in the Field, Manhattan, KS, US, 21-23 Nov 1982)

Farming systems research paper series, no.5, Apr 1983, 311p. : En

* Office of International Agricultural Programs, Kansas State University, Manhattan, KS 66506 USA

A Farming Systems Research and Extension (FSR&E) symposium was held in 11/82 at Kansas State University to examine issues in the application of FSR to development projects. Twenty papers from the symposium are herein presented, all of which focus on issues raised by experience, rather than theory.

Following an overview of the current state of FSR&E and its potential for the future, indepth case studies of four field experiences (IRRI/Indonesia, CIMMYT/Panama, ICAR-DA/Syria, and CATIE/Central America) are presented. The next five papers analyze specific problem areas (links to farmers and to other research programs/units, cost-effectiveness, transplanting U.S. methodologies, and conceptual errors in evaluation). The final ten papers, presented at small group meetings, address further FSR&E implementation and evaluation issues, e.g., in staffing, integrating team participants, organizing a delivery system, incorporating nutritional considerations, transferring station work to farm conditions, impact evaluation, and in determining the role of energy in farming systems. These papers make clear the necessity of systematically examining not only the farming system and its internal resources, but the containing system as well. Two preconference background papers on the FSR approach are also included.

083

PN-AAP-345

MF \$1.08/PC \$4.55

Hidden harvest: systems approach to postharvest technology

Spurgeon, David
International Development Research Centre
1976, 36p. : En IDRC-062e

It has been estimated that up to one-third of the food produced in developing countries is lost due to inefficient postharvest operations. After delineating various types of postharvest loss (losses in nutritional and economic value, in weight, and in quality and acceptability), the author of this report recommends a systems approach to postharvest losses and identifies the following primary components of the postharvest system: harvesting and threshing; drying and storage; processing; and utilization by the consumer. The interrelatedness of specific problems that may arise within the system is then demonstrated. Next, the Maiduguri Mill Project in Nigeria, which encompasses the entire range of postharvest activities, is described as a model of an orderly, efficient postharvest system.

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The report concludes with recommendations directed toward improved recognition and comprehension of postharvest problems and increased international cooperation in research and technical guidance.

084

* PN-AAP-229

PC \$2.34

Agricultural productivity gaps: a case study of male preference in government policy implementation

Staudt, Kathleen A.

Development and change, v.9, 1978, p.439-457 : En

* *Microfiche not available - paper copy only*

The weighting of Kenya's agricultural assistance policy towards men at the expense of women bodes ill for the country's agricultural future, according to this case study of the role of government in creating and/or perpetuating productivity gaps between the sexes.

A controlled, cross-sectional sampling of farmers at two locations in western Kenya shows that female-managed farms have significantly less access to government provision of crop information, training, and loans, than farms managed jointly by women and men. This situation obtains even though women farm managers, helped by information and labor inputs from the communal agricultural groups to which most of them belong, excel in key criteria - crop diversification, farm income-generating orientation, and early adoption of hybrid maize - for the innovativeness on which the government focuses its agricultural assistance efforts. In the long run, however, systematic government neglect of women will have a negative impact on women's ability to sustain innovative behavior and hence on their agricultural productivity. Failure to redress this structural disadvantage by channeling assistance on the basis of merit rather than sex, it is concluded, will eventually lead to a decline in the government's ability to raise agricultural productivity.

085

PN-AAP-586

MF \$2.16/PC \$17.16

Women, work, food and nutrition in Nyamwigura Village, Mara region, Tanzania

Tobisson, Eva

Tanzania Food and Nutrition Centre

TFNC report, no.548, Jul 1980, viii, 127p. : En

In Tanzania, agricultural policies biased toward cash crops and toward men as the sole agents of change have increased women's workload, but not their access to the products of farm labor. This study, based on extensive fieldwork during 1977-78, focuses on the effects of such policies on the nutritional status of Kurian women and children in the village of Nyamwigura.

Women's primary role in Tanzanian rural production and reproduction, and the neglect of them in development planning, are first discussed. The Kuria people, their land, and traditions ruling the division of work and of labor returns are then described. The transformation of agriculture during the colonial period from diversified subsistence production to specialized cultivation of maize as a cash crop is analyzed, as is the postindependence villagization program. Both policies, it is shown, have reinforced the traditional subordination of Tanzanian women. The combined effects of tradition and of these agricultural policies on the diet and health of pregnant and

lactating women and weaning children are then examined and the role of women in the village - particularly their virtual exclusion from decisionmaking and communal life - is discussed; results of a survey examining the responsibilities of husband and wife in the household economy are presented. Concluding remarks recommend policies and programs designed specifically to improve the health and status of Tanzanian women and children.

086

PN-AAN-810

MF \$1.08/PC \$5.85

Data collection, site selection and farmer participation in on-farm experimentation

Tripp, Robert

International Maize and Wheat Improvement Center

1982, 29p. + appendix : En Working paper no.82/1

9310840

The experimentation phase of on-farm research is devoted to designing trials to develop and test new technologies with representative farmers. Description of the various types of data available during this phase and guidelines for organizing their collection are herein presented.

A discussion of trial site selection focuses on the importance of identifying recommendation domains (relatively homogenous groups of farmers), cooperating with local extension agents, ensuring logistic feasibility, and identifying and communicating with farmer collaborators. A field book for recording various types of data, from data on planting and trial plot (and farmer) characteristics to data on trial results, is described (and reproduced in an appendix), and data collection possibilities in other areas (e.g., prices, weather, and farmer adoption of the recommended practice) are discussed. A set of recommendations is appended to each major section of the paper. The importance of flexibility is noted in conclusion, as is the researcher's need to use on-farm experiments to establish a partnership with farmers and extensionists which will benefit the research.

087

* PN-AAP-310

MF \$8.64/PC \$100.75

Control integrado de plagas en sistemas de produccion de cultivos para pequenos agricultores (Integrated pest control in small farm production systems)

Tropical Agriculture Research and Training Center;

International Regional Organization for Agricultural

Sanitation; University of California, Berkeley; U.S. Agency

for International Development

1979, 3v. : Es

5960064

* *Centro Agronomico Tropical de Investigacion y Ensenanza, Turrialba, Costa Rica*

In 1979 the University of California conducted a regional course in integrated pest control for small farm production systems at the Tropical Agriculture Research and Training Center (CATIE) in Costa Rica. Attending were pest control experts from eight Central American and Caribbean countries - Panama, Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, the Dominican Republic, and Haiti. The contents of the course are herein reported in three volumes.

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

Volume I contains 27 papers on such topics as the concept of agroecosystems, socioeconomic restrictions on small farm cultivation, harvesting, plant growth, vegetable parasites, the history of integrated pest control, nematodes, insects, vertebrates, and library research in economic entomology. Volume II's 19 papers cover principles of integrated pest control, pesticide formulation and application, chemical pesticides and environmental health, plant diseases in mixed production systems, and pests in cotton, potatoes, tomatoes, cassava, cocoa, and bananas. Volume III contains national reports on pest control for small farming systems in the eight participating countries. References follow each paper.

088

PN-AAP-311

MF \$2.16/PC \$15.34

Small farmer cropping systems for Central America: final report

Tropical Agriculture Research and Training Center
1979, xii, 101p. : En
5960064

Provides final report (6/75-3/79) on a project implemented by the Tropical Agriculture Research and Training Center (CATIE) to create a coordinated regional research approach for improving small farm cropping systems in Central America.

The project's key output was the development of a methodology or strategy for conducting on-farm research on small farm cropping systems and its presentation in a procedural guide. Some 115 field experiments were conducted, mostly on-farm, yielding quantifiable and very promising research results (the most important of which are indicated in the report), some of them ready for validation. In addition, CATIE promoted national research programs on cropping systems via training, information dissemination, collaborating in field work with national staff, and helping to promote a collaborative research effort among participating countries. Other project outputs included collection of baseline data on small farmers' agronomic, socioeconomic, and physiobiological environment; an experiment conducted at CATIE headquarters on several cropping systems commonly used by small farmers; the training of more than 379 Latin American professionals, over 75% of them Central Americans; the establishment of a documentation center on tropical cropping systems (a 20-page bibliography from which is appended); and the strengthening of CATIE's professional ties to other international research centers. Central American countries gave strong support to the project, and national institutions collaborated in all aspects of it.

089

* PN-AAP-954

MF \$3.24/PC \$25.87

Farming systems research symposium

U.S. Department of Agriculture. Office of International Cooperation and Development
(Farming Systems Research Symposium, Washington, DC, US, 8-9 December 1980)
1980, v.p. : En

* Office of International Cooperation and Development, Department of Agriculture, Washington, DC 20250 USA

Proceedings of a 12/80 symposium held to acquaint U.S. Department of Agriculture and A.I.D. agricultural technicians with key farming systems research (FSR) issues are presented.

Introductory papers provide overviews of FSR, its methodology, and its potential applicability in the United States. Next are two papers describing an FSR application in the Allegheny Highlands of West Virginia and a planned application at Arkansas's Booneville Center. Virginia State University's FSR efforts in the United States and Ghana are then discussed in a paper focusing on linkages and constraints; an abstract of a paper on research-extension interface in the United States is presented; and procedures for implementing applied FSR in developing countries' national research programs are outlined. The next four papers examine, respectively, problems involved in interdisciplinary research; FSR program structure, staffing, and funding; FSR and national agricultural development; and issues in FSR evaluation. A final set of papers describes Guatemala's Institute of Agricultural Science and Technology (ICTA), its FSR program, staffing and funding, and linkages with other national, regional, and international institutions. A summary of group reports and of a panel discussion on lessons for the future conclude the volume.

090

* PN-AAP-468

MF \$3.24/PC \$28.21

Economics and the design of small-farmer technology

Valdes, Alberto; Scobie, Grant M.; Dillon, John L.
(International Conference on Economic Analysis in the Design of New Technology for Small Farmers, Palmira, CO, US, 26-28 Nov 1975)
1979, xii, 211p. : En
* Iowa State University Press, 112 C Press Office, South State Ave., Ames, IA 50010 USA

Thirty-nine economists from 11 (mostly Latin American) countries attended a conference held in 1975 at the International Center for Tropical Agriculture (CIAT) to explore ways in which economists can contribute to the design of new agricultural technologies for small farmers. Proceedings are herein presented.

Provided first are three papers on the methodological aspects of ex ante technology design; the first describes several possible analytical approaches while the remaining two offer differing views of the importance of farmers' attitudes toward risk. Next, four papers on the design of technology analyze: the roles of biologists and economists in Bongoland (a fable); design parameters for cattle production in the Colombian llanos; technology design in semiarid Northeast Brazil; and the implications of sharecropping for technology design in that region. The remaining three papers, on the relation between rural development and agricultural technology, respectively: discuss technology adaptation in a Colombian rural development project; present a broad structural view of the small-farmer technology problem; and examine the implications of rural development programs for technology design.

Several questions are posed for further research: the priority to be accorded research on small farmer technology; whether policy and institutional changes are needed if farmers are to benefit from enhanced productivity; influences on small farmers' decisionmaking; and the stability and instability of the small farmer resource base. Appended are author and subject indexes and a 180-item bibliography (1921-77) of English, Spanish, and Portuguese titles.

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091

PN-AAP-684

MF \$1.08/PC \$7.93

Caso del ICTA en Guatemala como institucion dedicada a la generacion y validacion de tecnologia para pequenos agricultores (Case of ICTA in Guatemala: an institution dedicated to the generation and validation of technology for small farmers)

Waugh, Robert K.

Agricultural Science and Technology Institute
1980, 47p. : Es

The organization and program development of the Institute for Agricultural Science and Technology (ICTA), an autonomous Guatemalan research institution devoted to small farmers' needs, are reviewed.

The concepts underlying ICTA's establishment and its organizational characteristics are outlined, as are the Institute's goals of integrating research and extension, adopting a systems approach to research, and orienting research toward the farm level in replication of farmer practices and working conditions. Methods for achieving these goals are outlined, and the steps of ICTA's technology development system are described - technology generation, agro-socioeconomic adaptation and evaluation, validation, and transfer.

Farmer participation in the transfer process is described, along with the diversification of ICTA's program within the various regions of Guatemala, ICTA's training and evaluation activities, and its international linkages.

092

PN-AAP-446

MF \$1.08/PC \$2.08

Institutional assessment for implementing a systems approach to agricultural research and extension

Waugh, Robert K.; Meiman, J.; McDermott, James K.

University of Florida. Institute of Food and Agricultural Sciences; U.S. Agency for International Development. Bureau for Science and Technology. Office of Multisectoral Development; U.S. Agency for International Development. Bureau for Science and Technology. Office of Agriculture

Farming systems and support project working paper, no.101, 1983, 14p. : En

Characterization and analysis of existing national programs and institutions are useful in determining the potential for implementing a systems approach to agricultural research and extension. In this paper, guidelines are presented for inventorying a given program or institution in such a way as to identify changes and modifications that might make research and extension more effective while making maximum use of existing structures, resources, and other organizational characteristics.

Criteria for assessment are provided in Part I, which consists of three sets of questions directed toward determining (a) the general conditions of an institution and its environment, (b) management and operational aspects, and (c) the nature of the technological functions and methodologies of research and extension. Part II is meant to provide ideas as to which institutional elements should be continued and which should be changed. This section focuses on the functions of specific

types of organizational units in implementing farmer-oriented research and extension.

093

* PN-AAP-955

MF \$4.32/PC \$38.87

Agricultural systems in Ethiopia

Westphal, E.

Agricultural University. Department of Tropical Crops.

Laboratory of Plant Taxonomy and Plant Geography; Haile Selassie I University. College of Agriculture

Agricultural research reports, no.826, 1975, 278p. : En

* Centre for Agricultural Publishing and Documentation, Agricultural University, P.O. Box 9101, 6700 HB Wageningen, The Netherlands

Based on field research carried out in 1967-1968 and on literature studies, this second volume of a series on Ethiopia's edible plants provides an integral overview of the country's agricultural systems.

Initial chapters outline Ethiopia's geology, topography, hydrography, and define its diverse climatic regions. Next, soil taxonomy terms of the U.S. Department of Agriculture are used to describe the soils of seven defined soil regions. Vegetation zones and 16 vegetation types are described, followed by a brief look at the country's ethnic and linguistic groups. Ethiopian agriculture is then reviewed at length, with emphasis on the country's 12 agroecological regions and the plants cultivated in them, seed farming systems (mainly cereals, pulses, and oil crops), the cultivation and use of ensat (a staple crop), shifting cultivation, and pastoral systems. Where possible, linkages are made between farmers' regional origins and their farming systems and products. Finally, Ethiopia's marketing systems, major foods, and nutritional status are described.

Tables, photographs, a subject index, an index of scientific plant names, and 10 detailed maps are included, as are a list of crop yields (by kg/ha) and a 166-item bibliography (1540-1974).

094

PN-AAP-228

MF \$1.08/PC \$3.64

Risk, uncertainty, and the subsistence farmer: technological innovation and resistance to change in the context of survival

Wharton, Clifton R.

Michigan State University

Studies in economic anthropology, no.7, 1971, p.151-178 : En

A subsistence farmer is one who consumes most of what he produces, buys few items for his own needs, uses little outside labor, employs primitive or traditional farming methods, has a minimum standard of living, and bases his decisionmaking on survival. The correlation between the prevalence of high levels of risk and uncertainty among such farmers and their adoption of technology is explored in this literature review.

Subsistence farmers' responsiveness to technological change is described, along with possible sources of resistance, causes of risk, and sources of uncertainty. A model is presented for determining minimum standards of subsistence living at a certain time and how these standards change over time. Three types of subsistence farms are then identified: where the total product is food; where land and labor are the

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major production factors; and where the family lives entirely from the farm. Following a discussion of the effects of dynamic interaction of risk, uncertainty, and subsistence upon technological innovation, it is concluded that increased profit may be less important in a subsistence or barter economy than are increased security and survival, and that quantification of risk aversion is needed when evaluating technology adoption or rejection. Appended is a 91-item bibliography (1948-69).

095

PN-AAP-965

MF \$1.08/PC \$2.60

Nutritional component of farming systems research

Whelan, William P.
Rutgers University. Cook College. International Agricultural and Food Program
(1983), 18p. : En

Improvements in crop yield and farmer income achieved through farming systems research (FSR) projects do not in themselves signify improved household nutrition. Presented here is a strategy for incorporating nutritional considerations into FSR.

Variables that can provide important nutritional information during the FSR design stage are discussed first. The author considers - and rejects - several possible variables (i.e., anthropometric data, dietary intake, income and expenditure levels), outlining the difficulties of accurately identifying the malnourished using these approaches. Suggested instead is the subsistence potential ratio (SPR), the ratio of a household's ability to feed itself to its need to feed itself. The SPR, useful in measuring both the source and level of consumption, distinguishes between groups with different nutritional status and FSR's effects on them, has acceptable levels of accuracy, and is based upon easily and cheaply obtainable data.

Next, consideration is given to ongoing and ex post analysis of FSR's nutritional impact. Ongoing analysis is necessary to see whether changes in farming systems lead to short-term food scarcity. Ex post analysis requires a solid theoretical basis (e.g., the theory of the household-firm), a longer data collection cycle, and calculation of income elasticities, and should address the extent to which FSR benefits large rather than small farmers. Careful ex post analysis can help to identify ex ante variables for future FSR.

096

PN-AAL-956

MF \$2.16/PC \$15.99

Participatory approaches to agricultural research and development: a state of the art paper

Whyte, William F.
Cornell University. Center for International Studies; U.S. Agency for International Development. Bureau for Science and Technology. Office of Rural Development and Development Administration

Special series on agriculture research and extension, no. 1,
May 1981, x, 111p. : En

931001137

AID/TA-BMA-8

Existing research and development (R&D) strategies have tended to support farmers already in relatively advantageous

positions and to ignore the majority of small farmers who struggle under less favorable conditions. This state-of-the-art paper presents an overview of past R&D efforts and proposes a new R&D strategy to assist the rural poor.

After examining limitations of and lessons to be learned from conventional R&D strategies, the author describes the agricultural R&D strategy used by institutions in Bangladesh, Ethiopia, Mexico, and Colombia which emphasizes participation by small farmers and incorporates animal husbandry as an integral element. Efforts to build a farming systems research strategy into R&D programs are then examined, using examples from Guatemala and Honduras.

The author concludes that any new R&D model should involve research conducted on small farmers' actual fields; farmer participation in research and extension; and a major emphasis on cropping and farming systems, experimentation, and interdisciplinary collaboration. In order to enhance the quality of life among small farmers and to build material resources into the organizational base, linkages are required between local farmer organizations and government bureaucracies. Attached is a list of 107 references (1911-1981).

097

* PN-AAP-953

MF \$5.40/PC \$51.74

Proceedings of the international workshop on intercropping

Willey, R.W.; Garver, Cynthia
International Crops Research Institute for the Semi-Arid Tropics

(International Workshop on Intercropping, Hyderabad, IN, 10-13 January 1979)
1979, viii, 401p. : En

* ICRISAT, Patancheru P.O., Andhra Pradesh, India 502324

A state of the art summary, this 34-paper volume constitutes the proceedings of a 1/79 international workshop on intercropping hosted by ICRISAT. A workshop paper by an ICRISAT agronomist introduces the volume. Papers from Session 1, on agronomy, consist mostly of case studies from India, Brazil, West Africa (Nigeria, Volta), East Africa (Swaziland, Kenya, Uganda), and on genotypes. Papers from Session 2, on physiological aspects, treat: leaf canopies and plant light use (light use efficiency, plant interactions and productivity in complex mixtures, canopy development and light interception in sorghum/pigeonpea intercropping); nutrient interactions and rooting patterns (interactions below ground, leaf canopy and rooting pattern in pearl millet/groundnut intercropping, nitrogen response in sorghum/pigeonpea intercropping); and nitrogen fixation in sorghum/chickpea intercropping. Three papers on weeds and pests are drawn from Session 3. Papers from Session 4, on evaluating intercropping systems, discuss: statistical considerations and experimental designs; yield stability and economics (intercropping in traditional and dryland systems, stability of pigeonpea/sorghum intercropping); and operational management (including a paper on seeding and interculture mechanization requirements in India). Summaries of individual and plenary session discussions are provided. Appendices include French translations of abstracts of workshop papers and a 20-page, multi-language bibliography (1925-80).

BIBLIOGRAPHY OF READINGS IN FARMING SYSTEMS

098

PN-AAP-098

MF \$1.08/PC \$1.30

Aiming agricultural research at the needs of farmers

Winkelmann, Donald L.; Moscardi, Edgardo
(Seminar on Socio-economic Aspects of Agricultural
Research in Developing Countries, Santiago, CL, 7-11
May 1979)
1979, 9p. : En

Efforts of the Economics Program at the International Maize and Wheat Improvement Center (CIMMYT) to gear research on new technologies to farmers' real production problems and decisionmaking processes are reviewed. The key elements of the CIMMYT research procedures are: (1) ascertaining the circumstances and practices of representative farmers; (2) undertaking on-farm (and sometimes on-station) trials; (3) formulating recommendations and examining their implications for prices, markets, etc.; and (4) evaluating the new technologies.

This methodology, the authors note, is directed at finding technologies that farmers (CIMMYT's primary clients) will use, i.e., those which are consistent with farmers' natural and economic circumstances and which promise improved incomes with little risk. Thus, the CIMMYT program emphasizes collaboration between economists and biological scientists, early application of findings, and treatment of a single crop or mixture, and aims at useful, not necessarily optimal, technologies. The process systematically focuses on major constraints to production, provides for continuing and immediate improvements through research and feedback, and counts on individual farmers to make adjustments in terms of their own special circumstances.

099

* PN-AAM-515

MF \$2.16/PC \$20.41

Methodology for on-farm cropping systems research

Zandstra, Hubert G.; Price, E.C.; et al.
International Rice Research Institute
1981, viii, 147p. : En
* IRRI, P.O. Box 933, Manila, Philippines

On-farm cropping systems research seeks to identify a technology, acceptable to farmers, that will increase production yields and/or cropping intensity while minimizing the detrimental effects of introduced changes. Described herein, for the benefit of both professional researchers and those active in

research management and training, are research methods which were developed and adapted for the study of both dryland and wetland rice-based cropping systems.

The manual begins by discussing general concepts: the definition of cropping systems and of cropping systems research; and the importance of on-farm research as a means of finding improved cropping systems that are acceptable to farmers. Methods for site selection, site description, design of cropping patterns, and on-farm testing of such patterns are then described. In the final chapter, ways in which research results can be extended to a greater area and to farmers through production programs are discussed. This chapter, less detailed than those preceding, is included to emphasize the need for researchers to consider the consequences of their results in production programs and to stress that on-farm research is beneficial only when farmers adopt recommended practices. Details of several research or analytical techniques are provided in appendices focusing on fertilizer rates, weed control, varietal testing, and cropping pattern monitoring.

100

* PN-AAP-572

MF \$4.32/PC \$40.17

Caqueza: living rural development

Zandstra, Hubert G.; Swanberg, Kenneth G.; et al.
International Development Research Centre
1979, 321p. : En IDRC-107e

* IDRC, P.O. Box 8500, Ottawa, Ontario K1G 3H9 Canada

The Caqueza Project was a rural development effort conducted in eastern Colombia by the Agricultural Institute (ICA), the research and extension arm of the Colombian Ministry of Agriculture. This book records the history of the project's first 5 years (1971-76).

Part I describes the evolution of rural development philosophy in Colombia and outlines ICA's rural development model for the 1970's; specific information on the Caqueza Project is included. Part II describes chronologically the 5-year span of project activities and lessons, while Part III analyzes in some depth the research methodology tested during the project and the extent of its adoption by farmers. Part IV examines non-technical factors influencing adoption rates, such as risk, credit, marketing, training, and buffer institutions. A final section reviews the various evaluations of the project and provides an overview of the project as a whole.

Although it helped only a small minority of farmers, Caqueza strongly influenced ICA in terms of staff training and research policy and is the closest Colombia has come to an open dialogue among planners, agriculturalists, and farmers, the interaction among whom is the primary focus of the book's narrative. A 144-item bibliography (1957-77) is appended.

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