PN-ABD-218

International Service for National Agricultural Research

The International Service for National Agricultural Research (ISNAR) began operating at its headquarters in The Hague, Netherlands, on September 1, 1980. It was established by the Consultative Group on International Agricultural Research (CGIAR), on the basis of recommendations from an international task force, for the purpose of assisting governments of developing countries to strengthen their agricultural research. It is a non-profit autonomous agency, international in character, and non-political in management, staffing, and operations.

Of the thirteen centers in the CGIAR network, ISNAR is the only one that focuses primarily on national agricultural research issues. It provides advice to governments, upon request, on research policy, organization, and management issues, thus complementing the activities of other assistance agencies.

ISNAR has active advisory service, research, and training programs.

ISNAR is supported by a number of the members of CGIAR, an informal group of approximately 43 donors, including countries, development banks, international organizations, and foundations.

Special Series on the Organization and Management
of On-Farm Client-Oriented Research (OFCOR)

OFCOR–Comparative Study Paper No. 3

RESOURCE-POOR FARMER PARTICIPATION IN RESEARCH: A SYNTHESIS OF EXPERIENCES FROM NINE NATIONAL AGRICULTURAL RESEARCH SYSTEMS

by

Stephen D. Biggs

June 1989

International Service for National Agricultural Research

INTRODUCTION TO THE ISNAR STUDY ON ORGANIZATION AND MANAGEMENT OF ON-FARM CLIENT-ORIENTED RESEARCH (OFCOR)

Deborah Merrill-Sands
Study Leader

Introduction

In 1986, ISNAR initiated a major study on the organization and management of on-farm, client-oriented research (OFCOR) in national agricultural research systems (NARS). The study was developed in response to requests from NARS leaders for advice in this area and was carried out with the support of the Government of Italy and the Rockefeller Foundation. The objective is to analyze the critical organizational and managerial factors that influence the way national research institutes can develop and sustain OFCOR programs to realize their specific policies and goals.

What Is OFCOR?

OFCOR[1] is a research approach designed to help research meet the needs of specific clients, most commonly resource-poor farmers. It complements – and is dependent upon – experiment station research. It involves a client-oriented philosophy, a specific research approach and methods, and a series of operational activities carried out at the farm level. These activities range from diagnosing and ranking problems through the design, development, adaptation, and evaluation of appropriate technological solutions. Farmers are directly involved at various stages in the process.

In this study, OFCOR programs are analyzed in terms of the functions OFCOR can perform within the larger research and extension process. We have identified the following seven potential functions as a framework for analyzing the organization and management of a range of on-farm research programs in nine national agricultural research systems. The functions are:

1) to support within research a *problem-solving approach, which is fundamentally oriented toward farmers as the primary clients* of research;

2) to contribute to the application of *an interdisciplinary systems perspective* within research;

3) to *characterize major farming systems and client groups*, using agroecological and socioeconomic criteria, in order to diagnose priority production problems as well as identify key opportunities for research with the objective of improving the productivity and/or stability of those systems;

4) to *adapt existing technologies and/or contribute to the development of alternative technologies* for targeted groups of farmers sharing common production problems by conducting experiments under farmers' conditions;

5) to *promote farmer participation in research* as collaborators, experimenters, testers, and evaluators of alternative technologies;

6) to *provide feedback to the research priority-setting, planning and programming process* so that experiment station and on-farm research are integrated into a coherent program focused on farmers' needs;

7) to *promote collaboration with extension and development* agencies in order to improve the efficiency of the processes of technology generation and diffusion.

1. The designation *OFCOR* has been used as distinct from *farming systems research* (FSR) because the latter has come to have very different meanings for different people.

Why Is the Organization and Management of OFCOR Important?

Over the last 15 years, many NARS have set up OFCOR programs of varying scope and intensity to strengthen the link between research and farmers – particularly resource-poor farmers. While significant attention has been given to developing methods for OFCOR, provisions for fully integrating this approach within the research process have been inadequate and the institutional challenge underestimated. With the accumulation of experience, it is clear that NARS have confronted significant problems in implementing and effectively integrating OFCOR into their organizations. In many cases, OFCOR programs have become marginalized and have not had the intended impact on the research process.

Improved organization and management are crucial to overcoming these problems. Effectively integrating OFCOR within a research system implies forging a new research approach which complements and builds on existing research efforts. This is no small task. It involves establishing new communication links between researchers of diverse disciplines, extension agents, and farmers. It requires hiring people with the right skills or systematically training existing staff. It requires changes in planning, programming, review, and supervisory procedures. It creates increased demands for operational funds and logistical support for researchers working away from headquarters. And, it often involves working with one or more donor agencies. All of these make the management of OFCOR more demanding than that of traditional experiment station research.

This study focuses directly on these issues of implementation and institutionalization. We have analyzed and synthesized the experiences of diverse NARS in which OFCOR programs have been established for at least five years. The intention is to provide a body of practical experience upon which research managers can draw as they strive to strengthen OFCOR as an integral part of their research systems.

Operational Strategy and Products

Our approach has been to learn from the experiences of research managers in NARS. We have built the analysis around case studies of nine countries whose NARS have had sufficient time to experiment with and develop diverse organizational arrangements and management systems for implementing OFCOR. By region, the countries are as follows:

Latin America: Ecuador, Guatemala, Panama

Africa: Senegal, Zambia, Zimbabwe

Asia: Bangladesh, Indonesia, Nepal

The case studies are stand-alone products. Each is a comprehensive analysis developed by a team of national researchers with personal experience in the individual OFCOR programs. The cases provide important insights and lessons on the general issues, as well as specific guidance for research policy and the organization and management of OFCOR in their countries. The cases will be published in 1988. A list of the reports follows.

Comparative study papers providing a systematic analysis across the case studies are a second product of the study. Synthesizing the experience of case study NARS, these papers provide practical advice to research managers on organizational and managerial issues central to the effective integration of OFCOR within their research systems. The themes developed are:

1) Alternative Arrangements for Organizing OFCOR: Comparative Strengths and Weaknesses;

2) Integrating OFCOR and Experiment Station Research: Organizational and Managerial Considerations;

3) Organization and Management of Farmer Collaboration in Research;

4) Organization and Management of Linkages between OFCOR and Extension;

5) Organization and Management of OFCOR Research Process and Decentralized Field Operations;

6) Development and Management of Human Resources in OFCOR;

7) Financial Resource Use and Management in OFCOR;

8) Management of Relations with Donors and External Sources of Knowledge;

9) Issues in the Institutional Development of OFCOR in NARS.

We expect these papers to be published during 1988 and 1989. They are working papers presenting the results of the analysis of the nine concrete OFCOR situations. At this stage, they are intended to stimulate discussion and debate; they are not presented as "state-of-the-art" pieces on these topics.

MEMBERS OF THE STUDY GROUP ON ORGANIZATION AND MANAGEMENT OF ON-FARM CLIENT-ORIENTED RESEARCH

Advisory Committee

External

Jaqueline Ashby
Michael Collinson
Elon Gilbert
Grace Goodell
Anil Gupta
Roger Kirkby
Michael Sands
Robert Tripp

ISNAR

Paul Bennell
Matthew Dagg
Peter Goldsworthy
Emil Javier
David Kaimowitz
Diana McLean
Willem Stoop

Study Coordinators

Richard Bernsten
Stephen Biggs
Peter Ewell
Edgardo Moscardi
Susan Poats

Case Study Researchers

Md. Zainul Abedin, *Bangladesh*
Marcelino Avila, *Zimbabwe*
R. James Bingen, *Senegal*
Joko Budianto, *Indonesia*
Victor Hugo Cardoso, *Ecuador*
Miguel Cuellar, *Panama*
Patricio Espinosa, *Ecuador*
Jacques Faye, *Senegal*
Astolfo Fumagalli, *Guatemala*
Inu Ismail, *Indonesia*
M. Abdul Jabbar, *Bangladesh*
Badri N. Kayastha, *Nepal*
Stuart Kean, *Zambia*
Sudarshan B. Mathema, *Nepal*
Bright Mombeshora, *Zimbabwe*
Agus Mulyadi, *Indonesia*
Peter Rood, *Nepal*
Sergio Ruano, *Guatemala*
Lingston Singogo, *Zambia*
P. Sitorus, *Indonesia*
Rómulo Solíz, *Ecuador*
Sridodo, *Indonesia*
Suprat, *Indonesia*
Doah Dekok Tarigans, *Indonesia*
Ephrem Whingwhiri, *Zimbabwe*

ISNAR Staff

Deborah Merrill-Sands, *Study Leader*
Jean McAllister, *Research Assistant*

OVERVIEW OF THE NINE CASE STUDIES

Deborah Merrill-Sands
Study Leader

The OFCOR efforts reviewed in the cases vary in scope, the emphasis assigned to different objectives and functions, and the specific methodologies employed. They all conform, however, to the general definition of OFCOR developed for this study. The cases reflect a variety of institutional settings and strategies for introducing and developing OFCOR. They also reflect the broad range of models used in the organization and management of OFCOR. The profiles below highlight the salient features of each case and Table I provides some key descriptive indicators for comparison across cases.

Latin America

Ecuador

OFCOR is conducted by the Production Research Program (PIP, Programa de Investigación en Producción), an autonomous program within the Instituto Nacional de Investigaciones Agropecuarias (INIAP). It has two national coordinators responsible for the highland and coastal macro-regions and 10 regional field teams assigned to different provinces under the administrative auspices of regional experiment stations. Five teams are associated with integrated rural development programs.

Initiated in 1977 with support from CIMMYT, the case is particularly interesting because it allows us to trace the evolution of the organization and management of an OFCOR program from its origins as a pilot project through to its institutionalization as a full-fledged national program.

Guatemala

An OFCOR philosophy pervades Guatemala's 16-year-old agricultural research institute, the Instituto de Ciencia y Tecnología Agrícolas (ICTA). Two units, however, are specifically charged with carrying out OFCOR functions: the Technology Testing and the Socioeconomics Departments. The first is responsible for testing in on-farm trials all technology developed by the commodity programs. The second conducts diagnosis, on-farm monitoring, and special studies.

The 14 Technology Testing Teams are made up of scientists and technicians whose research is coordinated from regional stations but who live and work in designated research areas. The Socioeconomics Department is organized at the national level with representatives in some of the regions. Almost all scientists in the department are agronomists with training in social science methods. Coordination between the two departments is limited.

ICTA's experiences with OFCOR have had a major influence on other countries. What makes Guatemala especially interesting is that OFCOR was not appended onto an existing system. Rather, ICTA was set up from the beginning to incorporate the OFCOR philosophy. Moreover, this case also allows us to examine the organization and management of OFCOR within a regionally organized research system. This is important because a regionalized research system is generally regarded as the institutional setting most compatible with OFCOR's organizational requirements.

Panama

In the late 1970s, the Instituto de Investigación Agropecuaria de Panamá (INIAP) developed a "national plan " through which priority areas for on-farm research were selected. OFCOR is implemented in some of these areas as part of the regular research programs of scientists who also work on-station. In other areas, OFCOR is implemented through projects with full-time staff, developed in collaboration with international agricultural research centers. The projects are variable in organization and operation, and there is no mechanism at the national level for coordinating the diverse OFCOR efforts. What is particularly interesting about Panama's experience is the institutionalization of OFCOR as a research strategy, rather than as a formal program with a discrete OFCOR unit or units.

Africa

Senegal

The Department of Rural Sociology of the Institut Sénégalais de Recherches Agricole (ISRA) initiated an OFCOR program in 1978. It is now part of the Department of Production Systems and Technology Transfer (DRSP, Département des Recherches sur les Systèmes de Productions et le Transfert de Technologies en Milieu Rural), one of the four main research departments established in 1982 after a major reorganization of ISRA under the auspices of a World Bank project. The DRSP consists of a Central Systems Analysis Group (GCAS, Groupe Central d'Analyse Systèmes), three multidisciplinary OFCOR teams located at regional stations, a Bureau of Macro-economic Analysis (BAME, Bureau d'Analyses Macro-Economiques), and a division of thematic research. The case focuses on the OFCOR part of the DRSP, namely the GCAS and the three regional teams.

Senegal is an interesting case because the classic regional team model for implementing OFCOR was modified to include a core multidisciplinary group of scientists, the GCAS, which supports the work of the teams. Also of interest is Senegal's experience blending francophone and anglophone approaches to on-farm research.

Zambia

The Adaptive Research Planning Team (ARPT) conducts OFCOR in Zambia. The ARPT, initiated in 1980, is a national research program under the Research Branch of the Ministry of Agriculture. It is of equal status to and complements the national commodity programs. The ARPT comprises a national coordinator, based at the central research station, and seven teams of scientists and field technicians at provincial experiment stations. Each team is funded by a different donor.

ARPT includes two particularly interesting innovations: the formal integration of sociologists and the inclusion of research-extension liaison officers in the teams.

Zimbabwe

Zimbabwe's Department of Research and Special Services (DR&SS) adopted OFCOR in 1980 as a strategy for reorienting research to meet the needs of small farmers in the communal areas. This was in response to the post-Independence national policy to emphasize agricultural development for this sector.

There is no integrated OFCOR program. Several research institutes and stations and a specialized Farming Systems Research Unit (FSRU) have developed independent initiatives. The case study examines OFCOR in the FSRU and four institutes – the Cotton Research Institute, the Agronomy Institute, the Crop Breeding Institute, and a regional research station. This provides us with an unusual opportunity to analyze the implementation and integration of OFCOR under several distinct models for organizing research, but all within a single institution.

In the institutes, individual scientists carry out both on-farm and station-based research, while scientists in the FSRU specialize in on-farm research. The FSRU consists of a core multidisciplinary team based at the central station and two regional teams staffed by technicians. Their research has had a strong systems perspective emphasizing crop-livestock interactions.

Asia

Bangladesh

The Bangladesh case study concentrates on the on-farm research activities of the Bangladesh Agricultural Research Institute (BARI), the largest unit of the NARS. The On-Farm Research Division (OFRD), created in 1985, has the exclusive mandate for on-farm research in BARI. OFCOR teams are located at 23 stations and substations, from which they direct technicians in 11 farming system research sites and 83 multi-locational testing sites.

The OFRD subsumed four distinct older programs: multi-locational testing of the Soil Fertility and Soil Testing Institute (later renamed the On-Farm Trials Division); cropping system research on the IRRI model; varietal testing and verification of the wheat program; and the adaptive research of the T & V Ex-

tension Research Program. An important aspect of the Bangladesh case study is its analysis of the consolidation of these different approaches to OFCOR under common management.

Indonesia

OFCOR is implemented in Indonesia's Agency for Agricultural Research and Development (AARD) in sub-programs of the commodity institutes, and also in multi-institute projects organized at the AARD level. The case study focuses on two examples of each major type.

The multi-institute projects are an interesting institutional innovation. These projects are staffed by senior scientists seconded from the participating institutes. They maintain contact with their home institutes and return to them at the end of the project. We wanted to examine this arrangement because of its potential for building strong links between OFCOR and station-based specialist scientists, as well as for the long-term integration of the OFCOR philosophy and methodology within the NARS.

The gradual evolution of OFCOR as a research strategy in the NARS is another important aspect of the Indonesian experience. Starting as an informal program of one institute in the early 1970s, OFCOR methods were slowly integrated into other commodity institutes. Specialized teams have only been developed since the early 1980s. OFCOR in Indonesia has been a national initiative which has drawn on a number of approaches to OFCOR, particularly that of the Asian Cropping Systems Network developed in association with IRRI.

Nepal

On-farm research programs of different types have existed in a variety of institutions in Nepal since the early 1970s. Out of the diverse settings of OFCOR in Nepal, we chose five sub-case studies which illustrate the major models of organizing OFCOR:

1) OFCOR implemented through a commodity program – the National Rice Improvement Program;
2) OFCOR implemented through a cropping systems program;
3) OFCOR implemented through a specialized unit – the Farming Systems Research and Development Division (FSR&DD), supported by a separate socioeconomics division;
4) OFCOR implemented as a generalized strategy in two small, externally funded, regional research institutes – Lumle Agricultural Research Centre and Pakhribas Agricultural Centre.

The contrast between the OFCOR programs of the NARS and those of the externally funded institutes make Nepal an especially interesting case.

Table 1
Descriptive Indicators of the Nine OFCOR Studies

Case Studies	National Agricultural Research System		Organization of OFCOR	Years in Operation [3]	Scale of OFCOR: (Scientist Years)	
	Institutional Type	Organization of Research Program			OFCOR as % of NARS Human Resources	Size of OFCOR effort
Ecuador	Semiautonomous institute (INIAP)	Regional research stations/commodity programs	Production Research Program (PIP)[b]: National program with two coordinators and 10 teams based at regional research stations	9	6	14
Guatemala	Semiautonomous institute (ICTA)	Regional research programs/commodity programs	Technology Testing Department with 14 field teams in 6 regions and national socioeconomics department with limited regional representation [c]	14	34	65
Panama	Semiautonomous institute (IDIAP)	Commodity programs/ regional offices	National OFCOR plan identified target regions where OFCOR is implemented through special FSR projects or part-time on-farm research	7	16	24
Senegal	Semiautonomous institute (ISRA)	Multi-commodity departments/ regional stations	OFCOR, located within Department of Production Systems Research and Technology Transfer (DRSP)[d], consists of 3 regional teams and a Central Systems Analysis Group	4	13	22
Zambia	Ministry (MAWD)	Commodity and factor programs	OFCOR program with national coordinator and 7 provincial teams at regional stations.	6	20	38[h]
Zimbabwe	Ministry (MLARR)	Commodity and disciplinary based institutes and stations	OFCOR implemented by: - 8 research institutes/stations with combined on-station/on-farm research programs; - Farming Systems Research Unit (FSRU) based at central station with two regional teams.	6	18	26
Bangladesh[1]	BARI, semiautonomous institute of larger NARS with council	Disciplinary departments/ commodity programs	On-Farm Research Division (OFRD), with Central Management Unit at headquarters and 24 teams deployed through BARI's network of regional stations, has official mandate for on-farm research. Consolidation of previous OFCOR efforts.	9[e]	12	104
Indonesia[2]	Ministry, Dept of Research (AARD) with multiple institutes and coordinating bodies	Commodity-based regional institutes	Two principal modes of implementation: - Research institutes conduct OFCOR as part of regular programs; - OFCOR projects organized at AARD level with staff seconded from multiple institutes	11[f]	n/a	57[i]
Nepal[2]	I. NARS, ministry II. LAC and PAC:[a] externally funded autonomous institutes	I. Commodity programs / disciplinary departments III. LAC: Multi-disciplinary research thrusts PAC: Disciplinary departments	I. - Farming Systems Research and Development Division (FSR&DD) with 6 FSR sites, supported by Socio- Economics Research and Extension Division (SERED); - Commodity programs with multi-locational testing and outreach programs II. LAC and PAC, regional institutes with OFCOR as a generalized research strategy	14[g]	n/a	35[i]

Table 1 (notes)

1. The case study is limited to the Bangladesh Agricultural Research Institute (BARI), the largest of the five institutes coordinated by the Bangladesh Agricultural Research Council (BARC).

2. The data refer only to the subcase studies unless otherwise indicated; NARS-wide data are not available.

3. Base year for all statistical data is 1986.

a. Lumle Agricultural Centre and Pakhribas Agricultural Centre.

b. Programa de Investigación en Producción.

c. The Spanish names for these departments are Prueba de Tecnología and Socioeconomica.

d. Département de Recherche de Systèmes de Productions et Transfert de Technologies en Milieu Rural.

e. Refers to NARS. Several OFR programs with complex histories operate within BARI. The oldest, the On-Farm Fertilizer Program, dates back to 1957. This program was reorganized in the late 1970s, about the same time Cropping Systems Research was established at BARI. The OFRD was not formally consolidated until 1984.

f. Refers to NARS. In 1973, multiple-cropping research in the Central Research Institute for Food Crops took on a systems orientation and was renamed cropping systems research (CSR). CSR moved onto farmers' fields in 1975.

g. Refers to NARS. Cropping/farming systems research was initiated nine years ago. On-farm rice research is 14 years old.

h. Includes six research-extension liaison officers seconded from extension.

i. Represents totals for subcase studies only. Not directly comparable to other NARS-wide data.

LIST OF OFCOR CASE STUDY REPORTS

— Zambia: Organization and Management of the Adaptive Research Planning Team (ARPT), Research Branch, Ministry of Agriculture and Water Development. (S.A. Kean and L.P. Singogo)

— Zimbabwe: A Case Study of the Organization and Management of Five On-Farm Research Programs in the Department of Research and Special Services, Ministry of Agriculture. (M. Avila, E.E. Whingwiri, and B.C. Mombeshora)

— Sénégal: Organization et Gestion de la Recherche sur les Systèmes de Production, ISRA. (J. Faye and J. Bingen)

— Ecuador: Un Estudio de Caso de la Oganización y el Manejo del Programa de Investigación en Finca de Productores (PIP) en el Instituto de Investigaciónes Agropecuarias (INIAP). (R. Soliz, P. Espinosa, and V.H. Cardoso)

— Guatemala: Organización y Manejo de la Investigación en Finca en el Instituto de Ciencia y Tecnología Agrícola (ICTA). (S. Ruano and A. Fumagalli)

— Panama: Un Estudio de Caso de la Organización y el Manejo del Programa de Investigación en Finca de Productores, Instituto de Investigaciónes Agropecuarias (IDIAP). (M. Cuellar)

— Bangladesh: A Case Study of the Evolution and Significance of On-Farm and Farming Systems Research in the Bangladesh Agricultural Research Institute (BARI). (M.A. Jabbar and M.D. Zainul Abedin)

— Indonesia: A Case Study on the Organization and Management of On-Farm Research in the Agency for Agricultural Research and Development, Ministry of Agriculture. (J. Budianto, I.G. Ismail, Siridodo, P. Sitorus, D.D. Tarigans, A. Mulyadi, Suprat)

— Nepal: A Case Study of the Organization and Management of On-Farm Research in Nepal. (B.N. Kayastha and S.B. Mathema)

CONTENTS

List of Tables and Figures

Acknowledgements

This paper is a result of a collaborative group effort. It is based on the case studies prepared for the ISNAR study on organization and management of on-farm, client-oriented research in national agricultural research systems, which are listed in the first section of the bibliography. It also draws on discussions at two study workshops, in 1986 and 1987, and research meetings with Deborah Merrill-Sands, Peter Ewell, Susan Poats, James Bingen, and Jean McAllister. I am grateful for the ideas, stimulation, materials, and work that has come from these sources. We hope that, as the study is written up, all those involved feel that their contributions are adequately recognized.

I have tried to present material from the case studies and discussions as fairly as possible; I apologize for any errors or misinterpretations that may remain. I am grateful to Jackie Ashby, John Farrington, Diana McLean, Roger Kirkby, Rob Tripp, and Bright Mombeshora for comments, and to Peter Rood and Stuart Kean for many discussions on concepts and case-study material. Finally, I would like to thank Christine Wilson, who undertook the challenge of editing the paper. As usual, I accept full responsibility for the material.

Stephen Biggs is a Lecturer at the School of Development Studies, University of East Anglia, Norwich, United Kingdom. He is one of the Study Coordinators for the OFCOR project.

Glossary of Acronyms

AGRITEX	Department of Agricultural, Technical, and Extension Services, Zimbabwe
AI	Agronomy Institute, Zimbabwe
ARPT	Adaptive Research Planning Team, Zambia
BARI	Bangladesh Agricultural Research Institute
CART	Communal Area Research Trials, Zimbabwe
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CBI	Crop Breeding Institute, Zimbabwe
CIAT	Centro Internacional de Agricultura Tropical
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo
CLSR	Crop Livestock Systems Research, Indonesia
CRI	Cotton Research Institute, Zimbabwe
CSR	Cropping Systems Research, Bangladesh and Nepal
FSR&DD	Farming Systems Research and Development Division of the Ministry of Agriculture of Nepal
FSRU	Farming Systems Research Unit of the Department of Research and Specialist Services, Ministry of Lands, Agriculture, and Rural Resettlement of Zimbabwe
ICTA	Instituto de Ciencia y Tecnología Agrícolas, Guatemala
IDIAP	Instituto de Investigacion Agropecuario de Panamá
INIAP	Instituto Nacional de Investigaciones Agropecuarias, Ecuador
IRRI	International Rice Research Institute
LAC	Lumle Agricultural Center, Nepal
LRS	Lowveld Research Station, Zimbabwe
MARIF	Malang Research Institute for Food Crops, Indonesia
NARS	National agricultural research system(s)
NRIP	National Rice Improvement Program, Nepal
OFCOR	On-farm client-oriented research
OFRD	On-farm Research Division, Bangladesh Agricultural Research Institute
PAC	Pakhribas Agricultural Center, Nepal
PDRI	Programa de Desarrollo Rural Integrado, Ecuador
PIP	Programa de Investigación en Producción, Ecuador
RIAP	Research Institute for Animal Production, Indonesia
SERED	Socioeconomic Research and Extension Division of the Ministry of Agriculture, Nepal
CSRP	Small Ruminant Project, Indonesia
T&V	Training and Visit Extension Programs
UACP	Upland Agriculture and Conservation Project, Indonesia

INTRODUCTION

This paper reviews the experiences of nine national agricultural research systems: Ecuador, Guatemala, Panama, Senegal, Zambia, Zimbabwe, Bangladesh, Indonesia, and Nepal.[1] In these countries, resource-poor farmers have been designated as major clients of research and all have had major on-farm client-oriented research (OFCOR) efforts in operation for several years.[2] One of the principal objectives of these programs has been to promote participation of resource-poor farmers in research. This has been stressed because it increases the cost-effectiveness of research and helps keep research priorities focused on the clients.

This paper reviews the experiences of resource-poor farmer participation in the agricultural research process and draws out lessons for agricultural research managers. Participation in this context is seen as the involvement of farmers in research activities as clients, colleagues, partners, planners, and evaluators in the research process.

I. Clients of On-Farm Client-Oriented Research: Resource-Poor Farmers

Almost all of the OFCOR programs in the case studies were set up as a result of research policies to develop technology for poor farmers in agro-ecologically marginal regions. These programs have required researchers to organize new ways of involving farmers in the generation and transfer of technology. For example, in Zimbabwe, before Independence in 1980, research and development policies served the interests of the large-scale commercial farmers.

This powerful group participated actively in both research and extension, and had an important voice in state policy on prices, input subsidies, marketing boards, and other institutions affecting their interests. Few resources were allocated to the communal areas[3] where most African farmers live. The challenge faced by research managers after Independence was clear: the system had to be reoriented to meet the needs of a new group of clients. This has required the development of new ways to involve farmers in the research process.

In Nepal, the national research system has served both small and large farmers for many years, but there has been a serious bias towards resource-rich regions, particularly the lowland Tarai. The challenge faced by OFCOR has been to develop technology appropriate for small farmers in the hills, who have limited access to irrigation or inputs such as fertilizers. Methods of working with farmers in irrigated areas, where most households practice broadly similar cropping patterns, have had to be rethought.

The agro-ecological conditions in Guatemala and Ecuador are significantly different, but on-farm research programs have faced similar issues. The agriculture sector in both countries is dualistic. The needs of large farmers specializing in export crops have been the dominant research priorities for many years. The clients of on-farm research programs are frequently small-scale producers of food crops, located primarily in ecologically complex highland regions. Ethnic, socioeconomic, and linguistic barriers between them and the research scientists have had to be overcome.

II. International Work on Participation of Farmers in Research

There is a watershed of international interest in studies that address issues of farmer participation in research.[4] The literature is not reviewed here, but attention is drawn to its importance, and it is suggested that research managers link in-

1. See list of case studies, pp xiii.
2. Refer to Introduction by D. Merrill-Sands for definition of on-farm, client-oriented research.
3. The Communal Areas are a legacy of colonial land policy which authorized the private ownership of commercial farmland for the benefit of white settlers, and then recognized traditional communal patterns of land tenure for the African population in the remaining more marginal areas of the country. Today the communal areas comprise 42% of the land area of Zimbabwe.
4. Workshops on farmer participation held at the International Rice Research Institute in 1986, on "Farmers and agricultural research: Complementary methods" held at the Institute of Development Studies in July 1987, and on operational approaches to participative technology development held at the Information Centre for Low External Input Agriculture, Leusden, The Netherlands, in April 1988. The topic has also been the subject of some of the networking activities of the Farming Systems Support Project (FSSP) for several years, and as early as 1980 the International Potato Center issued circulars urging the involvement of farmers in research (CIP, 1981). The Agricultural Administration (Research and Extension) Network of the Overseas Development Institute has issued discussion papers and conducted reviews, one of which is Martin & Farrington (1987). Farmer participation is a major theme in Richards (1985), Vol. 24(3) of Experimental Agriculture (1988), and in Chambers & Jiggins (1987). Robert Tripp (in preparation) of CIMMYT has discussed these issues in depth and Lightfoot et al. (1988) discuss experiences in the uplands of the Philippines. Stavis (1979) describes early experiences in North America of farmer participation in research.

to international networking systems where innovative ideas and methods concerning farmer participation are reported.

With an abundance of literature now available, local research managers face a most difficult task: how to receive and review international material and integrate it selectively with local innovations; that is, how do they turn ideas and theory into practice, often in difficult, risky, and resource-scarce situations?

III. Scope of the Paper

The analysis is divided into four chapters. The first chapter looks at the types of farmer participation in research in the country case studies. A typology of four modes of participation (contract, consultative, collaborative, and collegial) is used to differentiate the ways in which resource-poor farmers participate in research programs. The typology has implications for management and some of these are briefly described. The OFCOR programs in the country case studies are then described, with particular reference to the nature of participation. Modes of participation are subject to development policy, national agricultural research policy, institutional context, and changes in research methodology. Some of the ways in which these factors have contributed to changes in programs are considered.

Chapter 2 discusses the levels at which resource-poor farmers and scientists interact, looking in particular at the village, national, and regional levels. The complex and often difficult circumstances at the village level have implications for managers; and several aspects of these are discussed, including bias, the status and role of scientific staff, local politicians, community representatives, and the staff of extension and development agencies. These factors contribute to the way in which a research program is implemented; they are crucial to the nature and extent of resource-poor farmer participation.

A major part of Chapter 3 discusses meetings between researchers and resource-poor farmers as an important complement to trials and surveys. Such meetings require careful design and clear objectives if the resources allocated to working with farmers are to be used efficiently and effectively. Farmers can be involved in meetings in a number of ways. These are set out, bearing in mind the location-specificity and nature of the research program. The case studies show considerable experimenting with different types of meetings to improve farmer participation; some of those at the village and national level are described.

The fourth chapter draws out lessons and implications for research managers. It concludes by placing emphasis on the need to support local research practitioners in finding ways to develop new methods and techniques for increasing the participation of resource-poor farmers.

CHAPTER 1
PARTICIPATION OF RESOURCE-POOR FARMERS IN RESEARCH

The idea of farmers participating in research is not new. In research on some colonial export crops and in some "green revolution" situations, commercial farmers have participated actively. They took their problems directly to scientists, they had trials and demonstrations on their farms, they visited research stations and selected new technologies for use on their farms, they carried out adaptive research with fertilizer applications and new cropping patterns, and they had the power to influence the direction and output of research–they sat on boards of research institutions, marketing boards, and input supply corporations.

Resource-poor farmers, however, have had limited access to the information generated through formal science and have little power to bring pressure to bear on public-sector research systems. On-farm client-oriented research (OFCOR) is designed to address this deficiency and strengthen the link between research and resource-poor farmers. It offers specific methods for defining client groups and identifying their priority needs, for conducting adaptive research under real farming conditions, and for involving farmers actively in the research process.

I. Modes of Farmer Participation

On-farm and farming systems research literature has always placed a strong emphasis on farmer participation and collaboration, and on talking to farmers about their needs, problems, and reactions to technology. This orientation can be applied to any group of farmers, resource-rich or -poor, but most of the recent on-farm literature and activities have been directed at the problems and predicaments of the resource-poor.

However, while the need to work with resource-poor farmers has been recognized, there is a wide difference of opinion over central issues such as how farmers should participate, for what purpose, and at what stage in the research process. A lack of clarity has at times led to a failure of other scientists and farmers to understand what on-farm researchers were trying to do, often resulting in implementation problems.

To facilitate analysis of these issues, four modes of farmer participation in research have been defined in this section as a framework for understanding farmer participation in the case studies (see box).[5] A brief overview of the nature of farmer participation in the OFCOR case study research systems provides a reference point for each situation, and some implications of the typology for research managers are discussed. Finally, the chapter outlines changing patterns of farmer participation in OFCOR programs and analyzes major causes for these changes.

Types of Farmer Participation	
Mode	**Objective**
Contractual:	Scientists contract with farmers to provide land or services
Consultative:	Scientists consult farmers about their problems and then develop solutions
Collaborative:	Scientists and farmers collaborate as partners in the research process
Collegial:	Scientists work to strengthen farmers' informal research and development systems in rural areas

The modes are distinguished by differences in objectives and the organizational and managerial arrangements they require for implementation. Table 1 lays out the distinguishing features of each mode of farmer participation and each is described in detail in the following sections.

Formal and Informal Agricultural Research and Development Systems

A key feature distinguishing the different modes of farmer participation is the attitude of researchers, who are part of the formal agricultural research and development system, towards research-minded farmers, who are part of the "informal" research and development system.[6] The terms "research and development" (R&D) are often used in describing industrial research and development processes. In this paper, applied research in agriculture is analagous to "research" (R) and adaptive research to "development" (D).

5. The classification used here is similar to Ashby's (1986). Our –contract" type is similar to her "nominal" type, but we have used this term in a broad sense to cover all on-farm trials of this type conducted by scientists. Our consultative mode is the same as hers. Her "decision-making" participation falls between our "collaborative" and "collegial" participation. Farrington and Martin (1987) give four conceptual approaches representing different degrees of participation.

6. For a recent discussion of the role and importance of experimentation by users in both industry and agriculture, see Ganser (1988).

Table 1: Participation of farmers in research: distinguishing features of four modes

	Contract	Consultative	Collaborative	Collegial
Type of relationship	Farmers, land and services are hired or borrowed, e.g., the researcher contracts with farmers to provide specific types of land	There is a doctor-patient relationship. Researchers consult farmers, diagnose their problems, and try to find solutions	Researchers and farmers are partners in the research process and continuously collaborate in activities	Researchers actively encourage the informal R&D system in rural areas
Research emphasis	Testing and verification of technology	Surveying and diagnosis, testing and adaptive research	Learning from farmers to guide applied and adaptive research	Understanding and strengthening informal R&D
Interaction over time with farmers	Variable	Determined by stages of activities, i.e., diagnosis, design, development, verification, diffusion, monitoring	Continuous specific emphasis of activities each year, depending on joint researcher / farmer diagnosis of local circumstances	Variable
Types of farmers involved	Those who can guarantee the conditions of the contract	Representatives of the client group (which is defined by scientists)	- representatives of client groups (which are jointly defined by scientists and farmers) and change over time - research farmers	Research farmers from the informal R&D system
Who speaks for resource-poor farmers in the research process	Views and opinions of farmers are not emphasized	- field-level staff - social scientists - local representatives	- themselves - research farmers - local representatives - junior and senior scientists	Themselves
Emphasis on extension / development	Variable	Research aimed at extension target areas or recommendation domains	Variable	Strengthening the integration of informal research and extension capabilities
Priorities in on-farm research programs	Trials and written reports	- informal surveys - trials - formal surveys - reports of researcher analysis - field days for extension purposes	- village research legitimacy meetings - meetings for diagnosis, planning, and interpretation - trials - formal surveys	- supporting research farmers and research-minded local representatives and politicians - information networks for resource-poor farmer

Research-minded farmers, although usually not trained in formal scientific methods, experiment systematically as part of their everyday production activities. These farmers, through their informal research activities, contribute to the stock of indigenous technical knowledge in rural areas and are important sources of technological innovation (Biggs and Clay, 1981). Such informal R&D systems have considerable potential to contribute to agricultural development.[7]

Many of the crop varieties still grown under the resource-poor conditions of developing countries have come from farmers' selections, and many of the ways in which new components from formal research are adapted for use under local conditions, e.g., new cropping systems, new management practices for irrigation and the use of herbicides and pesticides, have come from experimentation by research-minded farmers.[8]

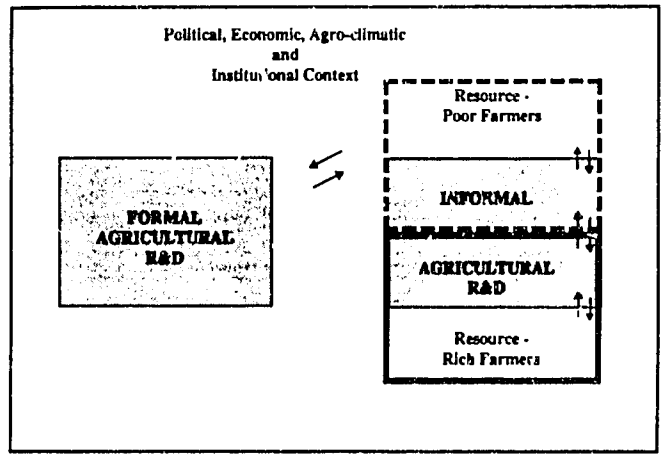
Alongside the "informal" research system, there are also "informal" development and extension systems. In a monitoring survey of an on-farm program in Nepal, for example, it was found that the widespread use of a rice variety, pokhreli masino, was not, as the researchers thought, due to its recent introduction through an on-farm project. It came as a result of farmer-to-farmer informal exchanges following its introduction in a demonstration program which distributed seed ten years earlier. The farmers involved all belonged to one ethnic group and did not include other farmers in the area (Green, 1987).

The ways in which informal development and extension systems operate, and interact with formal and informal research systems, is an important complementary study, but beyond the scope of this paper.[9] What is important to remember, however, is that agricultural research and extension activites, whether formal or informal, always take place within a political, economic, institutional, and agroclimatic context. As Figure 1 illustrates, this context affects the two-way flow of information, materials, and technological innovations and knowledge between different groups of farmers and between the formal and informal research and development systems.

Attention to the informal R&D system varies considerably with the mode of farmer participation being used. The contract mode of participation, for example, has little interest in indigenous technical knowledge, or in informal R&D processes. The consultative and collaborative modes both recognize the importance of indigenous technical knowledge and the consultative mode places great emphasis on

7. For papers on farmer experimentation, see Rhoades (1987), Ashby (1987), Box (1987), Biggs (1980), and Richards (1985).
8. For a full discussion of the strengths and weaknesses and complementary roles of formal and informal R&D systems in agriculture, see Biggs and Clay (1981).
9. These topics are taken up to some extent in another ISNAR project on research/technology transfer linkages.

Figure 1
The Political, Economic, Agroclimatic, and Institutional Context of Formal and Informal Agriculture Research and Development Systems



NOTE: The arrows represent the two-way flow of knowledge, materials, technology, information, and innovations between farmers and research and development (R&D) systems.

tapping into this knowledge to better inform scientists about local conditions and innovations. The collaborative mode learns actively from the informal R&D system about how to do research under farmers' circumstances.

The emphasis of the collegial mode of participation is different from both the consultative and collaborative modes. In this case, scientists of the formal system not only recognize the importance of contributions that farmers in the informal R&D system make to the research of the formal system but go further by studying the characteristics and behavior of the informal R&D system and placing emphasis on strengthening and providing support to it.

Contract Mode

In this mode the involvement of farmers is minimal; they provide resources, usually land, which scientists need for on-farm research.

The routine testing of technology in diverse agroclimatic environments is what many scientists see as the final stage of research station technology generation. They argue that if the varieties and technologies developed perform well under local soil and climatic conditions, they will be adopted without the need for tailoring to particular socioeconomic factors. Consequently, these scientists want to contract with the farmer to provide land of a certain type, and they will manage the experiments according to their design.

This mode of on-farm research is found in all the programs in the case studies. A good example is the large soil testing and soil fertility project started in 1957 in Bangladesh with FAO funds. There have since been a large number of varie-

tal, fertilizer, and management trials all over the country. Although this type of program, when conducted alone, may not be said to constitute client-oriented "on-farm" or "farming systems research," it is argued that it has to be seen and analyzed as part of the on-farm research programs, because many scientists feel that this contract mode is the most important type of all on-farm research activities.

An important aspect of the contract mode is that criteria used to judge "good" or "bad" on-farm trials should be different from the criteria used to judge trials conducted under experiment station conditions. A frequent problem for research managers is that some scientists try to use the same criteria.

A related aspect is whether a research system has a tradition of conducting "contract" on-farm trials. In Zambia, for example, there was virtually no such tradition, at least for the crops of resource-poor farmers, before the recent on-farm programs. On the other hand, in Bangladesh and Nepal there have been commodity and discipline-based programs on basic food crops for a long time and on-farm trials have existed for many years. A major challenge for research managers in these cases has been how to address the high degree of inertia and vested interests in the large-scale bureaucratic research structures that have ruled the on-farm programs for many years.

Consultative Mode

This is the dominant mode found in the case studies; it is used by CIMMYT and by IRRI in their cropping systems programs and has been the starting point of many programs in the case studies. The mode is characterized by a sequence of research stages: diagnosis, design, technology development, testing, verification, and diffusion. Farmers are interviewed about their problems at the start, after which scientists accord priorities, take most of the decisions, and design the trials and surveys. Farmer involvement increases again towards the end of the research process, they are asked to evaluate the new technologies.

There is often a hierarchical structure to the program, with senior staff supervising junior: for example, field staff may be given a number of trials to supervise or questionnaires to administer. The participation of farmers then becomes one of being supervised or being asked to respond to questions. Participation for resource-poor farmers often means being represented by others: in some programs by the social scientists, who act as their "voice." In other consultative projects the lowest-level field technician is responsible for collecting information from farmers and sending it through the system. In other cases, resource-poor farmers are "represented" by leaders or key informants in the village.

The emphasis in this mode has often been on adaptive research: taking new technology components, e.g., varieties, fertilizers and pesticides, and cropping patterns from commodity and disciplinary programs, adapting them to local conditions, and developing from them broad extension recommendations for specified groups of farmers. The consultative mode sometimes places emphasis on extension, and there are field days to show extension workers and farmers new technology coming out of the on-farm program. However, because most on-farm research activities are on farmers' fields or involve talking to rural households, villagers and scientists often see on-farm research as mainly an extension rather than a research activity.

In Guatemala and Ecuador the approach has been somewhat different. The on-farm research programs are not concerned with promoting packages. Instead, they test individual components which they expect farmers to adapt to their own systems. Linkages with extension departments are extremely weak in both cases–they see their on-farm experiments as demonstrations from which farmers will spontaneously select and diffuse innovations.

In some situations, the research problems being addressed have led researchers to place greater emphasis on farmer participation, and these programs have moved towards a more collaborative mode. In Nepal, the Pakhribas and Lumle agricultural research centers, working with complex farming systems in the Hills, initiated "group treks" or *samuhik bhraman*, in which groups and researchers go to villages and meet with farmers on a regular basis to plan and review research. Following their example, the Farming Systems Research and Development Division of the Ministry of Agriculture also introduced group treks for interdisciplinary groups of middle- and senior-level scientists in target regions. Their experiences show, however, that the organization and management of this type of regular meeting with farmers in the field has had major resource and management implications: what can be done quite easily by PAC and LAC, which have independent staffing and funding by a donor, is very much more difficult and challenging to organize within government departments.

In contrast, other programs, such as PIP in Ecuador, have moved towards a contract mode over time, in spite of some viable and successful farmer participation activities in their early days. Scientists are increasingly working with farmers who are "good collaborators" because they place a high priority on farmers' ability to implement trials as required in order to minimize trial losses and ensure that reliable formal trial data are obtained.

In Zimbabwe, the Agronomy Institute's on-farm program started off in a consultative mode, with extension workers making a significant input by helping to select farmers and manage the program at the field level. Farmers had major responsibilities in managing trials. However, trial losses and coefficients of variation were very high. It was found that there was little technology "on the shelf" which was

suitable for adaptive research and for transferring to resource-poor farmers in the communal areas. The institute felt that more applied research with tighter experimental control was needed at the farm level. They decided to reduce the regional coverage of the program and allocate more of the technical staff to live in villages and have direct contact with farmers. They reduced the percentage of farmer-managed trials in the program, thus moving towards a contract mode.

Collaborative Mode

This type of participation involves continuous interaction between researchers and farmers, who are seen as partners in the research process.[10] The emphasis is on treating farmer participation as a "monitoring" function to help plan the on-farm and on-station research each year. Diagnosis and assessment are carried out continuously with farmers and are not seen as activities which occur at the beginning and end of the project. For example, farmers are asked at the start for advice on whether they have already investigated a given problem or tried a certain technology. They are also asked how they would go about testing, for example, a new variety under their conditions. This is illustrated in Zimbabwe where the Farming Systems Research Unit program, after suggestions from farmers, changed a randomized block design for a crop trial to a strip design because it made it easier for farmers and researchers to compare treatments.

This mode does not follow strict stages of research. The emphasis of an on-farm program at a given time depends on the specific nature of the problems being faced by resource-poor farmers and the capabilities of the program. Each year, a range of surveys, trials, and management methods is used. Priorities in the use of scientists' time and other resources have changed from an emphasis on collecting formal data to holding meetings for different purposes, involving different groups of farmers and other people at the village level. For example, in Zambia, Zimbabwe, and Nepal there has been extensive experimentation with different types of meetings: for getting sustained support from local political figures, and for planning, implementing, and interpreting information from trials, surveys, and day-to-day contact with farmers.

New technology being developed by farmers is actively monitored, assessed, and used each year in helping to direct the activities of the formal research system. For example, in Zimbabwe, the cutting of sorghum shoots when the drought is severe, thereby leaving the base to ratoon when the late rains come, is an idea the scientists learned from farmers. In collaborative participation, such local information is more readily available. In some programs innovator surveys are used for collecting this type of information.[11] Ashby (1987) describes how collaborative participation was used in the design of fertilizer trials for beans and potatoes in Colombia, and resulted in a more cost-effective use of scarce research resources in the formal system.

In collaborative interaction, mechanisms are used to seek out research-minded farmers, and by keeping in contact with them over many seasons and years, scientists can establish confidence and an ongoing dialogue. This relationship results in continual open-ended assessment of all aspects of the research. For example, in the Maize OFR program in Indonesia, there are two cycles of three trials each year, each trial involving three cooperators. Trials are planned together and the on-farm team say that the best way to encourage farmers to maintain an interest in the trials is by generating farmer participation, not for monetary reasons, but because the results can be seen to be useful.

In some of the Nepalese national training programs on-farm research staff are urged to seek out research-minded farmers, who are then seen as a subgroup of the farmers with whom they interact. It is suggested that lists of these farmers be kept and passed on to new members of the program so that these important sources of information are not lost when there are staff changes (FAO/APROS, 1984). These farmers may or may not be part of the formal trial program and they differ from others in the project who may not be so research minded but who participate as ordinary production farmers.

The Dual-Purpose Livestock Project in Chiriqui, Panama, is a good example of a whole program using the collaborative mode of interaction. Each farm is treated as a research site, and each scientist has four to ten farms to cover so that there is enough time for involvement and the necessary discussion. It is interesting to note that as the project has continued, the commitment of the overall research program to collaborative farmer involvement has increased. The scientists are arguing strongly that, as a result of the variability of the farming environment and the long-term nature of research and production decisions, this joint collaborative mode should be continued.

In Zambia, in the Adaptive Research Planning Team in Luapula Province, many methods of interaction under the collaborative mode are now being used. This change from the previously used consultative mode came about partly as a result of a "perceptions" survey carried out because the local team was concerned about the lack of farmer cooperation in the program. The survey was intended to ascertain

10. An example of this mode is the work of Sumberg and Okali (1988), who have experimented with alley cropping in Nigeria. Maurya, Bottrall, and Farrington (1988) using this mode discuss how farmers are brought to the research station to select, with scientists, rice varieties which they then experiment with on their farmers.

11. For example, see Biggs (1980) and Agrawal et al. (1978). A review of practical methods being used by researchers in developing countries has been the focus of several recent international workshops referred to in the introduction to this paper.

farmers' perceptions of the project. It was an effective survey, partly because it was conducted by the team members themselves, who learned first hand how local villagers perceived their activities. The survey was never published, but as a management tool it was important in helping the team to work in a more constructive way.

In collaborative participation, considerable care is given to special meetings with farmers for research purposes; e.g., innovative farmer meetings in Bangladesh and special farmer/researcher meetings in Guatemala. These meetings are seen as quite different from field days and other types of meetings found in most on-farm programs.

Collegial Mode

This is where the formal research system actively strengthens the informal R&D system at the farmer, village, and community levels.[12] Under the consultative and collaborative modes of participation, scientists recognize that farmers and other people in the rural environment have indigenous knowledge which is useful to formal research systems, and this information is collected and used. Under the collaborative mode, scientists recognize that this indigenous knowledge is always changing, partly as a result of the existence and dynamic nature of informal R&D systems. However, what distinguishes a collegial mode of interaction from other modes is that the major emphasis is on activities which are designed to increase the ability of the informal systems to do research, and of informal systems to request information and services from formal ones.

The term "collegial" has been chosen because the two research systems are like two complementary colleagues in an academic environment. They are independent but closely interrelated; both recognize that they have complementary knowledge and skills, and they both need to support and strengthen each other. Under this mode of participation research-minded farmers have the major say in the running of a research site. For many activities the scientists are periodic guests in the local program.

In addition to the increased research output of informal systems, the strengthening of local research capability may also directly help address some of the logistical and management problems of formal research institutions. For example, the logistical support of isolated research sites is a chronic problem in OFCOR. Local farmers may cooperate by providing storage facilities for inputs and equipment or multiplying seeds. Another serious problem for formal research systems is the high turnover of field staff. Local research-minded farmers can help address this administrative problem by providing continuity and information to new junior field staff and to visiting senior scientists and other visitors.

Although there are no examples in the case studies of whole programs which have interacted with farmers in the collegial mode, there are a few individual examples of this type of activity. One example comes from Nepal: after scientists had stopped formal activities at one of the early cropping systems sites at Lele, they found that a local field staff member, a farmer, was getting other farmers to test varieties of ipil-ipil (*Leucaena*) trees. He had gone to Katmandu and brought back a selection for testing, as these trees had not been grown in that area before. The cropping systems project, which had largely used a consultative mode had, without giving it high priority, also helped strengthen the informal R&D capability.

Another example comes from Zambia where, in Luapula and Lusaka, there were two or three research-minded farmers who were known to have experimented on their own before the on-farm research program of the Adaptive Research Planning Team started. Researchers found these farmers extremely helpful when they explained to other farmers the concepts of research and experimentation behind the on-farm research program. Finally, in Zimbabwe the Farming Systems Research Unit makes sure that all equipment used in trial work, for example, different types of plows, remains with farmers or farmer groups during seasons of the year when researchers are not there to encourage them to experiment with the equipment on their own.

Management Implications of the Different Modes of Farmer Participation

The four modes of farmer participation outlined have been illustrated by material from the case studies. Some may consider that these categories are artificial, that the distinctions between them are arbitrary, or that on-farm research involves, and should contain, all four modes. But it is argued here that each places emphasis on different issues and research objectives and that these have major resource and organizational implications for managers who have to decide which is required and is feasible in his/her particular case.

The choice of mode would depend on the primary research activity to be implemented; for example:

Technology testing. If a research manager wants an on-farm trial program simply for varietal testing under diverse agroecological conditions, the contract mode is appropriate. This means using very different criteria for selecting

12. Richards (1985: 150) suggests that there are two broad approaches to this support: a minimal strategy whereby the researchers maintain a "space" between informal R&D and formal science to insure a minimum of conflict between formal and informal initiatives, and a positive strategy whereby researchers concentrate on finding ways to stimulate and support self-reliant R&D. Recently, Byerlee (1987) and Kenmore (1986) have suggested that greater attention in on-farm research programs should be given to training farmers to distinguish between and experiment with introduced technologies.

farmers, assessing work of the staff, and designing trials and surveys than those required where participation with farmers was intended to strengthen local informal R&D capability.

Technology ready for transfer. Where new viable component technology is available, or when the farming environment has been changed, for example by a major irrigation scheme, or where policies of subsidized inputs or high commodity prices exist, then the contract or consultative mode, with emphasis on the testing and transfer of technology, may be most appropriate. This was the case in the early on-farm wheat programs in Bangladesh and in the early days of the Caisan Project in Panama.

Problem diagnosis. In situations where the technical problems are inadequately understood and research resources scarce, farmer participation in collaborative and/or collegiate modes can be an effective, low-cost strategy. This was the case in the Dual-Purpose Livestock Project in Panama.

When a program's objectives are defined, managers must also consider how the program will be implemented, given the specific policy and institutional conditions in which they are operating. There is no single model; the mode of implementation is highly influenced by the context in which the manager is working. For example, a manager who has inherited a staff established for technology testing who wishes to promote a collaborative mode of farmer participation has a very different training and attitudinal challenge than if he/she had been able to take on new staff who already had had previous experience of collaborative research with farmers. The two research programs would require very different strategies for developing and implementing a collaborative mode of farmer participation.

Conclusion. An important management lesson is that managers have to be very clear about which mode is appropriate at a specific time. They then have to create a working environment which promotes one mode rather than another. It was found in the case studies that some on-farm research programs felt they were following one mode, while in practice they were actually implementing another. Research managers need to recognize that the actual mode followed results from the way resources and rewards are allocated within the research system. If no explicit research policy commitment is made to developing ongoing farmer participation, for example, it is unlikely that researchers will make a concerted effort to develop collaborative or collegial modes of participation which require a lot of time in the field, intensive interaction with farmers and significant creativity and innovation in research methods, experimental design, and analysis and reporting of results and farm-level information.

II. Experiences of the Case Studies

The participation of farmers in research has taken various forms in the different programs in the case studies. Table 2 classifies nearly 20 separate OFCOR programs according to the dominant mode and indicates how they have changed over time. In the following sections, brief sketches highlight the major characteristics of each. More detailed information on the organization and disciplinary composition of field staff is provided in other comparative study papers in this series (Bingen and Poats, *in preparation*; Ewell, 1988).

Ecuador

In its first years, the PIP on-farm research program in Ecuador was run as a special project in close association with CIMMYT (Tripp, 1982). It has followed a "restricted systems approach," a methodology which follows a pre-established sequence of surveys and on-farm trials. Agronomists have been trained in field research methods and in some techniques of economic analysis and survey implementation. Social scientists have been involved in initial surveys and other national activities, but none has worked permanently at the field level.

Farmers have participated within the consultative mode, as sources of information and resources. They have not been expected to take part in the design of trials or surveys, or in the interpretation of results. Half of the regional teams have operated within the framework of an integrated rural development program. In these cases, farmers were included more actively in research. Meetings were organized between farmers, researchers, and other project workers to select experimental sites and make other decisions about the program.

Since 1980, when the PIP was institutionalized as a regular program of INIAP with much less contact with CIMMYT, the degree of farmer participation has declined. Individual researchers have tended to select collaborators with whom it is convenient to carry out trials, rather than representatives of clearly defined client groups. The program as a whole has come under heavy pressure to test technology coming out of the stations, rather than continue to develop its own research program on the basis of an ongoing process of analyzing local priorities and needs.

Guatemala

On-farm research has been part of a comprehensive strategy of ICTA, the Guatemalan national research institute, since it was founded in 1973. OFCOR is implemented by two separate departments: Technology Testing and Socioeconomics. Farmers participate in the consultative mode.

All new varieties and improved technology coming out of the regional research stations are passed through a programmed sequence of on-farm trials run by subregional teams of the Technology Testing Department. Informal surveys called *sondeos*, conducted by interdisciplinary teams, were pioneered by the Socioeconomics Department as a rapid method for setting priorities for research (Hildebrand and Ruano, 1982). The social scientists have also conducted other types of studies, both on a national basis and in cooperation with the Technology Testing Department.

Budget restrictions imposed throughout the Institute in the early 1980s had mixed effects on the degree of farmer participation. The field researchers in Technology Testing were forced to rely more on farmers to provide labor, which led to more regular contact. On the other hand, the Socioeconomics Department went through a period of decline when very few new *sondeos* or other field research was done. Given ICTA's contributions to the development of on-farm client-oriented research approaches and methods, it is somewhat surprising that no systematic methods for selecting farmer have been developed, and that a number of promising methods for involving farmers in the research process have not been institutionalized.

Panama

In Panama there is a national plan for OFCOR and in many areas on-farm research is conducted by scientists who also work on-station. Most of these national activities are conducted in a consultative or increasingly a contract mode.

Two separate OFCOR programs in Panama are highlighted in the case study. The Caisan project, operating in high-potential area, has involved farmers in the consultative mode, following a methodology developed in collaboration with CIMMYT. A programmed sequence of surveys, on-farm trials, field days, and evaluation's limited participation to pre-established roles.

The Dual-Purpose Livestock Project is affiliated with CATIE and has applied a collaborative approach of continuous interaction with a small sample of farmers. The methodology was developed because small ranches do not have large enough herds to divide into statistically significant experimental treatments in a single season (Sands, 1987). This constraint, along with CATIE's commitment to a comprehensive systems approach, has led to the development of innovative techniques which draw on farmers' knowledge and experience for planning research and evaluating results over several years.

Senegal

The history of on-farm research in Senegal dates back before independence. The on-farm, client-oriented research program of the Department of Production Systems and Technology Transfer is organized into regional teams, each of which has followed a somewhat different strategy for involving farmers in research. When the Djibelor team was first organized in 1982, the senior agronomist, with the assistance of experienced technicians, consulted closely with farmers. Most trials were conducted by farmers who volunteered at meetings. He was replaced by younger scientists, who have not sustained the same level of interaction with either the technicians or the farmers.

The team in the Fleuve region has worked in a collaborative mode, involving farmers actively in the design of what they call "dialogue trials." Treatments are discussed and planned at meetings of researchers, extensionists, and farmers at the village level. The team at Kaolack is divided into two groups with very different attitudes towards participation. The first has concentrated on uniform trials carried out on farms according to rigid designs–a good example of the contract mode. The other is a multidisciplinary group which has carried out studies on a variety of problems and developed a consultative relationship with farmers.

Zambia

The nationally coordinated Adaptive Research Planning Team is composed of a national coordinator and seven interdisciplinary provincial teams. Farmer participation has been a major area of experimentation and methodological development within the program. One innovation in Central Province has been the "community perspective," a method for the selection of collaborators based on the analysis of the political and social structure at the village level. The team in Eastern Province started with widely scattered multilocational trials implemented by farmers through extension, with limited opportunities for feedback. The program was later consolidated into smaller areas, and greater attention was given to the selection of farmers and interaction with them. The Luapula team, in order to have more focused discussions with farmers, has separated field days into two events: one for extension workers and the other for farmers. The sociology section has worked with the provincial teams on ways of working more effectively with farmers and designing methods for farmer selection.

Zimbabwe

In Zimbabwe, the type of farmer participation varies considerably among the semi-autonomous research institutes which have established on-farm programs since Independence. The Crop Breeding Institute tests its advanced material on farms, but does not have a field staff and works with farmers in the contract mode. The Lowveld Research Station, works only with "master farmers," those who have received special training from extension, to conduct its experiments with soil and water conservation technology on farm. The Cotton Research Institute has a long tradition of working closely with commercial farmers, and has used ex-

tension agents very effectively to extend its specialized mandate into the communal areas in a consultative mode.

The Agronomy Institute started the Communal Area Research Trial program in the early 1980s. Multilocational testing trials managed by extension workers and farmers were scattered widely. Appropriate technology was not available, supervision was minimal, and loss rates and coefficients of variation were high. To address these problems, the Institute reorganized the program and posted its own staff in the field to carry out on-farm research designed to develop new technology. The research is now more applied in nature and trials are closely managed by research staff. The cooperation of farmers has been organized through the extension service.

The farming systems program of the same institute was merged with a livestock program in 1984 to form the Farming Systems Research Unit. A small interdisciplinary team based at research headquarters in the capital city, has been responsible for diagnostic studies of farming systems throughout the communal areas. They conduct on-farm experiments in two target areas, where technicians live and work in close contact with farmers. This is the only on-farm program which involves social scientists.

Bangladesh

The case study of Bangladesh concentrates on one large OFCOR program with a heterogeneous staff of over 100 scientists–the On-Farm Research Division of the Bangladesh Agricultural Research Institute (BARI). It was created in 1984 by consolidating four separate programs, some of which date back to the late 1950s. Social scientists were seconded from a another department to help with surveys and the analysis of data.

Management has faced a major challenge: how to forge a common institutional vision of what OFCOR is and how farmers should be involved. Some scientists with years of experience in multilocational soil fertility testing were accustomed to the contract mode of participation. Those in programs affiliated with a cropping systems network and those collaborating with a T & V extension system, were comfortable with consultative interaction. In 1986, a program was launched to encourage junior scientists based in the field to interact closely with farmers in a more collaborative spirit. It was hoped that this experience would help guide research on experiment stations (Gupta, 1987).

Indonesia

The Indonesian Agency for Agricultural Research and Development has operated dozens of on-farm research programs since a rice-based cropping systems program was initiated in the early 1970s. The case study highlights four OFCOR programs which were active in the early 1980s. Farmers have participated in various ways, in both the consultative and collaborative mode. Meetings with farmers have been used as a research tool in all cases.

The Upland Agriculture and Conservation Program has used meetings with farmers to select collaborators and explain the experimental procedures to be used in on-farm trials. The Crop Livestock Systems Research Project works with groups of farmers organized by village headmen. Scientists from the Small Ruminant Project hold monthly meetings in the villages of their target area to discuss the research program with both farmers and extension staff. A subsample of households is monitored intensively. The Maize On-Farm Research Project is part of a station-based maize improvement program. The research site is close by, and senior scientists visit frequently with a small sample of farmers with experiments on their land.

Nepal

The case study focuses on four different OFCOR programs, all of which participate in two types of national on-farm trials. The first, called Farmer Field Trials, are standardized multilocational experiments implemented in farmers' fields by extension agents. The second type, called minikits, involves farmers more directly: small packets of seed, sometimes accompanied with other inputs, are distributed to farmers with preprinted reply cards, on which they are supposed to write their comments for the commodity programs. Minikits have been a valuable mechanism for getting new varieties out to farmers, but little attention has been paid to collecting the cards or analyzing the data, so the feedback has been minimal.

The first program, the National Rice Improvement Program, runs an outreach project in the area surrounding its major station. It is designed to feed technology and information into the T & V extension program and provides a framework within which scientists from the station travel out and meet with farmers.

The second program, the Cropping Systems Program and its successor, the Farming Systems Research and Development Division, have concentrated on-farm research in selected target areas. As in all the programs in Asia affiliated with the network coordinated out of the International Rice Research Institute, farmer participation was at first limited to pre-established roles in the methodological sequence.

Innovative methods for involving farmers have been developed in OFCOR programs at the British-funded Lumle and Pakhribas Agriculture Centres. The most influential of these have been the group treks–regular events where senior scientists from the stations join field staff for a tour of the research sites, meet with farmers, set priorities, and plan on-farm research activities. This innovation has been adopted by the Ministry of Agriculture's Farming Systems

Research and Development Division, although their more restricted budget and lack of authority to invite people from other disciplines and departments has limited the participation of senior scientists.

III. Factors Influencing Changes in Modes of Farmer Participation

The following sections outline the major factors that have influenced whether the degree of participation has increased, decreased, or remained the same in the OFCOR programs studied.

Such changes are influenced by the development and policy context, national agricultural research policy and institutional context, and changes in research methodology. In some cases these trends are quite different from what the project's manuals or other planning documents said should or would happen. In Table 2, changes in farmer participation are indicated by arrows: a movement to the right represents an increase; to the left, a decrease; and a downward arrow represents a relatively stable situation. Almost half of the programs have increased participation by resource-poor farmers, approximately a third are stable, and in the remaining cases participation has declined. Because of the variation in size and age of the programs, these trends need to be interpreted very carefully. Nevertheless, it is possible to make some observations about factors which may have contributed to a change in one way rather than another.

National Policy Context

Methodologies and organizational innovations which encourage the participation of farmers in research require manpower, funds, and the support of national decision makers and/or foreign donors. The evidence from the case studies shows that participatory methods are very sensitive to shifts in national policy. If OFCOR is given a high priority as a strategy to meet the needs of resource-poor farmers, the degree of participation increases. If, on the other hand, support for OFCOR declines, on-farm research programs tend to retrench, and confine their activities to routine on-farm experiments carried out by the research staff.

For example, the PIP program in Ecuador was first set up at a time when the national government was committed to increasing agricultural production in the highlands, a region dominated by small, resource-poor farmers. Later, political priorities shifted to favor larger producers of export crops along the coast, and support for OFCOR declined. In Zimbabwe, OFCOR was established and has received continuous support as part of a policy for agricultural development focused on resource-poor farmers in the communal areas.

In Nepal, the national government has shown increasing concern to reverse the decline in per capita food production in the agro-ecologically complex and difficult hill regions. This has led to increasing support for OFCOR programs directed at resource-poor farmers. The Lumle and Pakhribas regional centers have been able to develop innovative participatory methods, in part because they have had a secure budget from the British government. The Farming Systems Research Division of the Ministry of Agriculture has found it more difficult to adopt group treks, partly because the agency has been chronically short of operating funds. In Panama, the externally funded Dual-Purpose Cattle Project has been protected from pressures to show results in the very short term. This has given the project the flexibility to develop technology with important long-term benefits. The field teams have found working directly with farmers to be the most cost-effective way to collect the data they need to meet their goals.

Age of On-Farm Research Program

The four modes of participation should not be interpreted as stages in a progression. Programs from the start can emphasize contract, consultative, collaborative, or collegiate activities. There is no evidence from the case studies that the degree to which farmers are involved in the research process tends to increase or decrease systematically over the life of an OFCOR program.

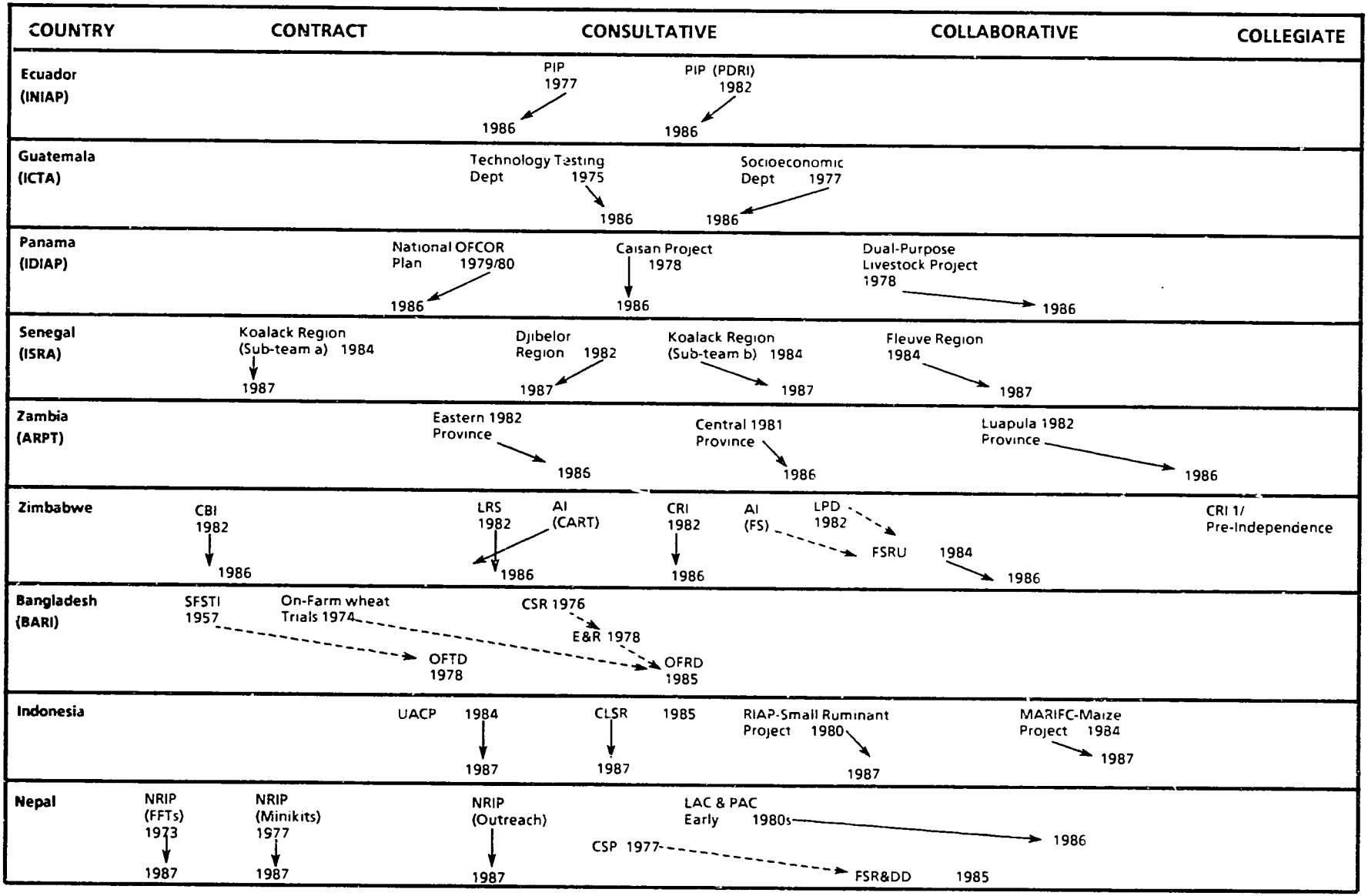
Organizational Structure of On-Farm Client-Oriented Research

The participation of farmers is easiest to organize in small, decentralized on-farm programs in which the field scientists have authority over the research agenda. In larger research systems, managers must actively introduce measures to keep decision making from becoming increasingly centralized. In BARI in Bangladesh, a program of on-farm trials was run out of the national offices of the commodity programs for several years. Only after the organization of decentralized field teams were the on-farm researchers in each region given the flexibility which has allowed them to find locally appropriate ways to involve farmers in the design and analysis of their research. These issues of the organization of field teams is treated in depth in a separate OFCOR comparative study paper (Ewell, 1988).

Flexibility of Research Methods

The participation of farmers in research depends upon flexibility in the methodology being applied. Standardized methods promulgated through prescriptive manuals have tended to inhibit the development of methods for farmer collaboration. For example, the Cropping Systems Programs in the Asian cases operated within a pre-established consultative mode for several years. The standardized methodology did

Table 2: Modes of resource-poor farmer participation in case studies



NOTES: The arrows indicate changes over time. The broken arrows show when a new institution has incorporated an old one.

1. The part of the Cotton Research Institute's program that interacts with resource-rich cotton growers.

not encourage local researchers to experiment with novel ways of increasing farmer participation. The costs of this approach were recognized and emphasis on standard methods has been reduced. In contrast, from the day it was founded the Adaptive Research Planning Team in Zambia has encouraged each of the provincial teams to experiment with methods which involve farmers in ways suited to local conditions.

Socioeconomic Barriers between Researchers and Clients

The active participation of farmers in research often requires breaking down socioeconomic barriers which separate scientists from the resource-poor clients of OFCOR. At least some differences in ethnic group, caste, social class, language, or educational background are deeply felt in all cultures. In many situations, it is easier to organize research within the contract or consultative modes, where researchers and farmers are assigned fixed roles in a more hierarchical structure, than in the collaborative or collegial modes, which require mutual respect and open, two-way communication. For example, ICTA in Guatemala has successfully developed an on-farm research program within the consultative mode. Several promising experiments with mechanisms to promote collaborative interaction with farmers have not been institutionalized. The authors of the case study say that while most scientists have accepted the utility of doing research in farmers' fields, they have not been convinced that uneducated peasants, many of whom do not speak Spanish, have anything to offer directly in the research process.

The majority of the scientists at the Pakhribas Centre in Nepal are members of the high-caste Brahmin and Chetri groups. In traditional terms, they are separated from the farmers in the target areas by a wide gap. The managers of the center have handled this problem in two ways. First, they have hired local farmers as field assistants and technicians, who act as intermediaries between the farmers and the researchers. Second, they have organized group tours which get senior scientists out into the villages in formal, structured events. These mechanisms have successfully fostered collaborative participation, which has made significant contributions to the program's success.

In several other countries, including Senegal, locally hired people, knowledgeable both about farming conditions and the requirements of research, have served as a critical link across socioeconomic barriers.

Role of Foreign Scientists

There is a close association in the case studies between the presence of foreign scientists and the degree to which farmers participate in research. Many donor-funded OFCOR projects have encouraged a "bottom-up" approach and have provided resources–vehicles, travel allowances, and per diems–and other support for activities which involve farmers. In several cases in Latin America, participation has declined after direct donor support has been withdrawn and the foreigners have left. This does not necessarily mean that it is the foreign scientists themselves who have made the difference. In Bangladesh, the predominantly national staff of BARI's on-farm research programs have steadily increased their contacts with farmers. They have been able to do so in part, however, because foreign donors have provided vehicles and operating funds.

Role of Social Scientists

In a closely related issue, the on-farm research programs which have organized participation within the collaborative mode are also those in which social scientists have constituted a large percentage of the professional staff. In Zambia, nearly 50 percent of the scientists with a BSc or higher degree in the Adaptive Research Planning Team were social scientists. Agricultural economists have developed on-farm research methods which involve farmers directly. Rural sociologists have focused on the process of participation itself, which has contributed to a shift towards the collaborative mode. In most of the cases, social scientists played prominent roles when the OFCOR programs were first developed. In Ecuador and Guatemala, the degree of participation by farmers declined significantly after OFCOR became established and the social scientists left. In Bangladesh, on the other hand, where large-scale on-farm testing programs in the contract mode dates back to the late 1950s, social scientists have increased in the project staff in recent years, and they have contributed to increasing the participation of farmers.

Conclusion

Research managers must maintain flexibility to be able to reallocate research resources as conditions and priorities change. Each mode requires a different way of organizing and managing research, and requires researchers with different skills. A move towards the collaborative and collegial modes is particularly difficult, as it often involves increasing the level of responsibility of the social scientist, and many natural scientists will not have been trained to work with social scientists in this way before. The management of human resources is one of the most important challenges for maintaining a dynamic and relevant OFCOR program with appropriate forms of farmer participation.[13]

13. See Bingen and Poats (in preparation).

CHAPTER 2
CONTEXT OF RESOURCE-POOR FARMER PARTICIPATION IN RESEARCH

Resource-poor farmers interact with scientists in different institutional settings and at different levels. To look at the different management techniques used to help farmer participation, village-level contexts are first reviewed, then participation at regional and national levels is considered.

I. Farmer Participation at the Village Level

On-farm research groups work in complex and often very difficult institutional and political settings at the village or field level. The challenge for local research managers and workers has been how to develop workable methods and techniques for their circumstances. Before looking at innovative methods evolving in national programs, it is important to examine the influence of various actors at the village level and look at the participation of resource-poor clients in the research process. Five major groups of actors are identified:

1) farmers;

2) scientists and technicians;

3) local politicians and community representatives;

4) staff of extension and development agencies;

5) nongovernmental organizations.

The presence and nature of these groups can have positive or negative implications for the participation of resource-poor farmers.

Farmers: Issues in Selecting Research Collaborators

A farming community is heterogeneous. It is composed of diverse groups of farmers with different levels of power, access to resources, and interest in participating in research programs. Researchers must be aware of this diversity when developing modes of farmer participation.

Bias against resource-poor farmers. A major problem in most on-farm, client-oriented research programs has been a bias in the selection of farmers. In many cases it has been found that the relatively more influential, resource-rich or "progressive" farmers are likely to dominate a program, unless care is taken to organize and manage the program.

Many on-farm research manuals and research projects have emphasized the need to identify and have resource-poor clients participate in the program, but this appears to have been one of the most difficult aspects of OFCOR to implement, given the context of agrarian structure at the village level.[14]

The experience of Zambia provides a good example. Until 1985, few on-farm research teams had recognized bias as a major concern or had given careful attention to procedures for selecting resource-poor farmers for trials or surveys. However, by the time of the Adaptive Research Planning Team's Annual Review in 1985, this had been identified as a major problem requiring attention. No standard approach for farmer selection for trials had been laid down, and each province evolved its own. Most teams either accepted farmers volunteering at meetings or used local extension workers and/or their technicians based in the field to recruit farmers, sometimes giving them criteria on which to base farmer selection. The major problems occurring were:

1) social pressures within the community had resulted in the more prominent, wealthy, male members, such as local leaders, being selected;

2) when junior field staff or extension workers were given the responsibility to recruit farmers they often selected "progressive" and "innovative" ones because they spent most of their time with them;

3) often the trial farmers and the trial plots were widely scattered.

Each provincial team has responded to these problems in various ways, and the ARPT Sociology Section has been helping to find cost-effective ways to select representative farmers and other participants in villages (Ewell, 1988; Sutherland, 1988).

Nevertheless, concern for equity should not imply that OFCOR programs work exclusively with resource-poor farmers. More prosperous members of the community, who may be able to take more risks, may be research-minded and able to conduct research which has relevance for resource-poor farmers as well. Attempts to exclude all prosperous farmers will preclude working effectively in the local community. Political realities often require the cooperation of the local elite.

The Small Ruminant Project in Indonesia selected farmers in each site to represent five resource-base strata, ranging from the owners of less than 200 square meters to owners of more than one hectare. Although the project is oriented to the resource-poor, other farmers are not being excluded.

14. See Ewell (1988: 27-31).

However, by taking explicit measures to reduce their influence, there has been less chance that they will come to dominate the program.

Another problem occurs when an on-farm program or team changes its objectives and methods when it comes under new management, as is evident from the example of Central Province in Zambia. Here the first team used a careful method, based on a set of seven criteria, to select farmers who were representative of the target group. Most of the team changed the following year, however, as did methods for selecting farmers. These researchers, who were more interested in working with farmers who would implement trials correctly than in selecting representative farmers, adopted more ad hoc selection procedures of either accepting volunteers at meetings or having junior field staff choose farmers. This led to significant biases in the sample of farmer cooperators towards better-endowed male-headed households, as was revealed in the mid-term evaluation of the project.

When yet a third team began work the following year, methods changed again. The researchers were interested in consolidating trials to improve monitoring and management and to build up stronger links with farmers. They adopted what is called a "community perspective," and farmers are now carefully selected from political sections of 25 households, and trials are clustered to facilitate management. Other provincial teams have taken this general approach and adapted it further to suit their particular research conditions (Sutherland, 1988).

Selection of research-minded farmers. From the review of the case studies, it is clear that some OFCOR programs have differentiated between "ordinary" and "research-minded" farmers within the collaborative and collegial modes of participation. Both the Dual-Purpose Livestock Project in Panama and the Small Ruminant Project in Indonesia have selected a small group of research-minded farmers with whom the scientists have a high degree of interaction. In the Malang Research Institute for Food Crops maize project in Indonesia, the researchers have reduced the number of collaborators to only three farmers in each season to facilitate close and ongoing interaction.

In Bangladesh and in the Technology Testing Unit in Guatemala, meetings to discuss particular problems involve a subgroup of research-minded farmers. In the Fleuve on-farm project in Senegal the dialogue trials include treatment and field layout suggested by farmers. They also cover part of the cost of the experiment. This certainly reflects a situation where farmers are seen as researchers. In some programs, agronomists are favoring an approach in which they work with the same farmer over a series of years, so that a research dialogue develops. The operative criterion is that they are seen as "research-minded" farmers, and they should not come to be seen as representative of all farmers or a model of what other farmers should become. The Dual-Purpose Livestock Project in Panama has invested time and resources in identifying research-minded farmers and working with them over a period of several years.

The lesson for research managers is that several criteria have to be used in the selection of farmers. These should be based upon the specific research objectives and purposes for farmer participation.

Scientists and Technicians

Considerable differences in the membership of on-farm research teams at the village level have been found. The amount of time senior members spend in villages also varies across programs and has a major effect on the work and analysis carried out within programs. These issues are central to the work of on-farm research, and a detailed discussion of this topic is included in another comparative study paper by Ewell (1988).

The following factors affect farmer participation and farmer/scientist relationships:

1) status of scientific staff;

2) role of different disciplines in OFCOR programs;

3) hiring of local staff;

4) personal and social context;

5) special project effect.

These are reviewed below.

Status of scientific staff. It is highly significant whether the project staff in the village environment are senior or junior in the research system. A senior-level person can make decisions with far-reaching effects on future research plans and priorities; a junior person cannot. This problem is revealed in numerous ways and each research manager has to find locationally specific ways to address it.

In Bangladesh it is difficult to provide incentives for senior staff to visit or live in remote areas. BARI has recently reorganized its annual planning meetings to allow junior field staff, who interact most with farmers, to have a voice in the selection of research station priorities.

In the same institute, household surveys have been conducted by female scientists who normally work only at the research stations. The purpose of these surveys was more than just to collect information; they enabled middle- and senior-level scientists to have firsthand contact with a specific group of people at the village level. This was another method for increasing the chances that the problems of a specific group of clients (resource-poor women in this case) would be recognized in the research planning pro-

cess. The research station women were becoming a "voice" for poor women in villages.

In Lumle Agricultural Centre in Nepal, the development by researchers of the combined trek to get senior scientists to regularly tour villages in their target area is an important innovation by which village-level problems are brought into the research station planning process.

Role of different disciplines in OFCOR programs. Having members from different disciplines does not necessarily mean that scientists will work as an integrated research team. Some of the cases reported situations of different disciplines carrying out entirely uncoordinated research, with the results being stapled together as an integrated report.

In some programs there is a major problem that data, irrespective of whether they are collected by trials, surveys or by meetings, are not used in a timely way. For example, the BARI economists, although formally engaged to conduct surveys and partial budget analysis on new cropping patterns, often had "their" information ignored. It was quite clear that farmers would never adopt some of the new cropping patterns being tested on their fields, given normal circumstances under which farming took place. The trials went on, however, and, as might be expected, many farmers would not follow instructions; thus farmer participation, according to the agronomists, was unsatisfactory.

In some programs, social scientists have been used to find ways of increasing effective participation of farmers. In Zambia the rural sociologist in the national program has spent much professional time analyzing the participation of farmers in the research process at the village level. His job has been more than just studying the process in an academic sense or as an evaluation; he has been active in helping to find viable methods for improving the way the on-farm research teams carry out their work.

Also in Zambia, in Luapula Province, the economist was concerned about the way farmers perceived the on-farm research group, and he got the team to do their own survey of farmers to find out what the farmers thought the team was doing. His role was quite different from that of the economists in the Cropping Systems Program in Nepal, where they were mainly collecting costs, returns and labor use data, and conducting partial budgeting analysis and household case studies. While a balance needs to be maintained between these very different types of social science analysis, it is clear that what social scientists can make a big difference to the work of the team and in particular the participation of farmers in the formal research program.

Hiring local staff. The importance of having field technicians who know about local farming practices is well illustrated in the Djibelor project in Senegal. The two technicians were local; they were familiar with farming practices and mixed constantly with farmers. The senior rice agronomist, who was in charge of the on-farm research and parts of the on-station program, viewed them as his eyes and ears in the village. He trusted their knowledge and advice on the interpretation of information, particularly since they had been in the research system for many years and knew how on-station research was organized and managed.

Hiring local villagers to work as technicians was also seen as a key feature to building strong community-based ties in Pakhribas and Lumle Agricultural Centres in Nepal, in the Small Ruminant Project in Indonesia, and in the work of the Technology Testing Teams in Guatemala.

These types of village-level interactions represent a very different situation from some of the sites of the Farming Systems Research and Development Division in Nepal, where some of the junior scientists at the village level have never farmed themselves, come from other parts of the country, do not like the site to which they are assigned, are only at one location for a short period, and sometimes have arrogant attitudes towards "traditional" farmers.

Personal and social context. In the Senegal study the predicament of on-farm research scientists and technicians draws attention to the situation of staff working at village level. The situation has been described by a scientist as one where "the whole village falls in on you." Not only are there requests for credit and other inputs, and political and bureaucratic factors to be handled, but there is also a personal dimension. For example, the young unmarried researchers and technicians are seen as potential spouses for village people. In all programs, issues such as ethnic background, nationality, and seniority affect the relationship between scientific staff and different groups of farmers. These factors are as important as "technical" methodological considerations because it is they that determine whether and how OFCOR methods are actually used in the village.

Special project effect. Certain sites have been the location of repeated studies and training programs. This means that the farmers in the area are no longer representative of typical conditions that researchers will face in other areas. In Zambia a site used to demonstrate CIMMYT methods for defining recommendation domains in the late 1970s was also the location for in-country training in survey and trial methodology. This resulted in certain areas being well researched and good relationships being developed between farmers and scientists.

Local Politicians and Community Representatives

Underpinning many initiatives by researchers in poverty-oriented on-farm research programs is formal and explicit recognition of the political nature of village life, and the need to gain political support at village and national levels. In some of the early work, on-farm groups were advised to

contact local leaders and key informants in order to seek advice on village affairs and farming practices. In consultative projects this was part of the standard procedures. It was recognized that political activities existed, but they were often characterized as constraints to on-farm work. It was often junior staff who had to cope with the problem, with senior staff or the writers of books on methods for implementing on-farm research having little or nothing to say on how to address these realities. What has now changed in some programs is that politics, power and influence in the village context are seen as important for systematic analysis and program actions as defining client groups, farming systems, soil types, and climatic conditions.

In Zimbabwe, in recognition of the need to gain political support for research, the FSRU have divided field days into two types: for the "public" meetings they invite political and development leaders as guest speakers; the "internal" meetings are kept for research discussions with farmers. In the Luapula Province ARPT program, the team have gone to considerable lengths to gain the support of the local traditional leader, involving him or her totally in the program. This active, explicit, and systematic involvement of local influential figures appears to be an important contributing factor to effective long-term implementation of on-farm research methods.

It is increasingly recognized that the use and sharing of community resources, and the implications of individual and group behavior on long-term community welfare, must also be considered. In Zambia, a special survey technique called the "community perspective" highlighted the importance of kinship links for technical development, which was subsequently studied in more detail. As a result of this knowledge, the farmers selected for participation in the program were significantly changed.

In Indonesia the Upland Agricultural and Conservation Project is concerned with the local community's customs and rules for soil and water conservation in three watersheds. In Nepal the Farming Systems Research and Development Division is addressing the issue of how areas of communal agroforest land can be managed while taking into account the needs and livelihoods of villagers who graze animals and gather fuelwood. The program is also having to analyze how the local panchayat will manage the programs and who will gain and lose.

Staff of Extension and Development Agencies

Most OFCOR projects place considerable emphasis on development goals. Many of the methodologies used in the consultative mode of farmer participation are oriented towards extension recommendations. The extension/research linkage in OFCOR is a major concern of this study and is the subject of a forthcoming comparative study paper (Ewell, in press).

What is emphasized here is that the existence of extension and development staff from other organizations can have a significant effect on the type and quality of resource-poor farmer participation in on-farm research programs. Four situations are found at the village level:

1) On-farm research evolves within an extension and development project.

2) Research and extension staff are in different organizations, but the programs are integrated.

3) On-farm research and the extension programs are part of a development project.

4) On-farm research group and extension programs are separate.

On-farm research evolves within an extension and development project. The research programs of PAC and LAC in Nepal grew out of a long-established extension and training program for a specific group of farmer clients: ex-Gurkha soldiers. The centers were well known in the area; farmers were used to going to them for advice, training, and technology, and the staff of the centers spent considerable time in villages. The centers developed on-farm and on-station research programs as a result of recognizing the need for better locally adapted technology. Throughout this process, there has been a high degree of interaction between farmers, extension staff and researchers.

Research and extension staff are in different organizations, but the programs are integrated. In Zimbabwe, all on-farm research programs have been integrated to varying degrees with the national agricultural extension program at the village level. Generally, extension staff have been involved in selecting farmers for participation in the on-farm research. Similarly, in the Small Ruminant Project in Indonesia, researchers, farmers, and staff of local Ministry extension agencies take part in ongoing tripartite village-level meetings to plan and implement the research each year.

On-farm research and the extension programs are part of a development project. Some of the PIP teams in Ecuador work within the framework of integrated rural development projects. They have taken advantage of meetings with farmers organized by the larger project to select collaborators and to discuss results. Nevertheless, they have been drawn into the routine activities of the project, and the OFCOR methodology has lost some of its focus. At Pakhribas Agricultural Centre in Nepal, the integration of research with a regional development project has resulted in positive feedback to the research station. It is important for research managers to recognize the potential risks, as well as benefits, of having OFCOR research integrated in a development project.

On-farm research group and extension programs are separate. In the Crop-Livestock Systems Research in In-

donesia, the research team saw itself as the generator of technology, and the job of extension staff was to transfer this to farmers. Neither farmers nor extension staff participated very much in research planning.

In many situations OFCOR programs and extension staff work in the same areas, conducting trials and demonstrations, with different criteria for the selection and supervision of farmers. The very presence of two or more programs in the same area can have a major impact on the type of farmer participation in the on-farm research because of the different expectations created. Free inputs are often provided by a development project but not by researchers.

Considerable care must be given to investigating what other agencies are doing in the area, and to taking these factors explicitly into account when designing methods for farmer participation. Also, what might be appropriate to special projects may be totally inappropriate in the context of long-term activities in ministries and government agencies.

Nongovernmental Organizations

Some nongovernmental organizations are becoming involved in on-farm research.[15] A notable example is the Mennonite Central Committee in Bangladesh, whose program was part of a large on-farm research program in the NARS, which was formally institutionalized to become the National Coordinated Farming Systems Program in the early 1980s. In Guatemala, the World Neighbours were involved at one stage in ICTA's OFCOR program.

One reason for involving such organizations in on-farm research is that they often have more flexible structures and management systems than special donor projects and government agencies. NGOs generally work at the village level and have a high degree of contact with farmers. The challenge for local research managers is to find effective ways to collaborate.

Conclusion

The case studies reveal that working at the village level is extremely difficult, and some of the hardest jobs are left to the most junior staff. In the past there has often been little support from senior management, and standard methodological manuals have rarely provided guidance. Senior staff should play an active role and participate in the organization and management of on-farm research at the village and household levels.

II. Participation of Farmers at Regional and National Levels

Resource-rich farmers often participate in meetings at research stations and of varietal release committees, and have associations which lobby for research on specific topics and influence the direction of research. For example, before independence in Zimbabwe, the Commercial Farmers Union had great influence on the research system. Since Independence, the Government has tried to promote a similar role for the National Farmers' Association of Zimbabwe, which represents resource-poor farmers in communal areas. So far it has not been nearly so effective.

In Panama the Instituto de Investigación Agropecuario de Panamá has two advisory boards: a Consultative Board of Users and a Technical Board of Advisors. However, there was no evidence that resource-poor farmer participation influenced the direction of research.

Research Stations

While many countries have a tradition of resource-rich farmer interaction with research stations, resource-poor farmer participation has been neglected. An example of important meetings between poor farmers and scientists is at the Lumle and Pakhribas Agricultural Centres in Nepal, where farmers are welcome, and many have participated in agricultural training programs. The centers have provided seeds, inputs and other extension services to farmers over many years and scientists of the centers know some of the farmers well.

At the Ishurdie Regional Station in Bangladesh, the head of the OFCOR program changed the way field days at the station were organized. Previously, farmers were invited to look at experiments and listen to talks by scientists and politicians. Under the new system, farmers were expected to bring problems which researchers would discuss with them. Two-day progressive farmer workshops were held at the station, where on-farm and on-station trials were discussed. Details of the participants is not given.

In Nepal there were a few cases of farmers joining tours to see new technology in other areas of the country and in India. The participation of farmers in selecting technology for themselves has not, however, been institutionalized.

Conclusion

It appears that the participation of resource-poor farmers in nonvillage-level activities has received little attention in

15. Examples are covered in a recent review of farmer participation in research by Farrington and Martin (1987). There were papers on this topic at the workshop on agricultural research methods at IDS, Sussex, in July 1987 (Pacey et al., forthcoming). Research on this topic is under way at ODI in London. A Bolivian case study on interactions between NGOs and the public sector is discussed by Thiele, Davies, and Farrington (1988).

most on-farm research programs in the past. This may be due to the "on-farm" nature of OFCOR. However, one lesson to be drawn is that in research systems biased towards resource-rich farmers, the participation of those farmers in decision-making often extends through the research and extension hierarchy. A major challenge now for OFCOR managers is to develop methods and institutional structures by that resource-poor farmers can participate in and influence decision-making at higher levels in the research system.

CHAPTER 3
MEETINGS: A TOOL FOR STRENGTHENING FARMER PARTICIPATION

This chapter reviews some of the ways in which resource-poor farmers participate in the research process through meetings. Although farmer participation has been the subject of many papers and the objective of many plans and projects, putting it into practice has been very difficult for research managers. The organization and management of on-farm activities are covered in greater detail by Ewell (1988), and the following discussion concentrates on the significance of meetings as a component of that topic.

Meetings between farmers and scientists should be seen as a complement to trials and surveys. In the past, standard farming systems research methods have focused on trials and surveys, but evidence from the case studies shows that carefully organized meetings are increasingly important for the participation of resource-poor farmers in the research process.[16]

Meetings as a strategy have two functions:

1) a research tool for collecting and analyzing information;
2) a means for organizing and managing farmer participation more efficiently and effectively.

It is a critical management task to design different types of meetings according to these objectives. Poorly organized and conducted meetings, which lack a clear purpose, are a waste of resources.

I. Trials, Surveys, and Meetings

Resource-Allocation Decisions

In all on-farm research programs choices have to be made between the time and other resources to be spent on trials, surveys or meetings. All managers face shortages of resources of one kind or another and have to allocate them between competing needs. How to achieve and maintain the best pattern of resource allocation over time is a difficult task. In this regard on-farm research is no different from other areas of research and development.

If all of a project's emphasis is on conducting a large number of widely distributed on-farm trials or on large-scale surveys, there is often little time or other resources for selective meetings with farmers. While it is difficult to get accurate information on the resources available and the relative importance accorded to trials, surveys, and meetings, it is clear from the cases that managers have adopted very different strategies for allocating resources among these three areas. For example, since the early 1960s Bangladesh has had a very large on-farm trial program under the Soil Testing and Soil Fertility Program, but minimal resources were spent on household surveys and meetings with farmers. Despite ample overall on-farm research resources, surveys and meetings had low priority in the budget.

This was very different from the recent pattern of resource of allocation in Zambia, where a far higher proportion of resources were allocated to surveys and meetings and the proportion going to meetings has been gradually increased. In the Dual-Purpose Livestock Project in Panama, a large proportion of their most valuable resource (trained scientific personnel) is allocated to meetings with farmers, reflecting the high priority given to informal and formal meetings with their small groups of research-minded farmers.

Defining the Purpose of Meetings

It might be argued that the distinction between surveys and meetings is artificial, since all farmer/scientist meetings can be seen as part of a survey. While the purpose of informal and key informant surveys is to meet and have discussions with farmers, the issue here concerns the purpose and emphasis of the activity. In many surveys, meeting with farmers is necessary to obtain information. The actual discussions during the interview are important only in so far as they facilitate obtaining accurate information. But there is a whole range of meetings in which the emphasis is on the ways different people participate in the decisions about the interpretation of information and the way the program is organized and managed.

In the Small Ruminant Project in Indonesia, which emphasizes the collaborative mode of participation, monthly village meetings are held to discuss the design of trials. This is a very different type of trial discussion meeting at village level from that at the Agronomy Institute in Zimbabwe, which organizes participation within a consultative mode, and holds meetings to tell farmers what the trials are going to be. Each type of meeting is valuable within the context of its program. Meetings must be designed to meet specific research objectives.

Emphasis on Meetings

However, even with this proviso it has been found in the case studies that many programs are increasing the emphasis given to carefully designed meetings for a wider range

16. Several papers from the IDS workshop have discussed group meetings: (Norman et al., 1988; Baker et al., 1988; Kean, 1988).

of purposes. This has happened in response to recognition that the problems of resource-poor farmers are far more complex than had been expected, and that the research process must be organized more flexibly. Changes, often involving greater contact between senior scientists and farmers, have broadened the agenda to include more factors faced by small farmers in particular environments, particularly when it is found that there is no appropriate technology "on the shelf." It is significant that, in response to the new challenges, there has been increased attention on the nature and quality of farmer involvement.

Management Lessons

Four lessons arise from the review of case experiences with meetings:

1) To be effective as research tools, meetings must be carefully designed and must have clearly defined objectives.

2) The choice of mode of participation will, to a large extent, determine the balance of resources to be allocated to trials, surveys, and meetings, and how these are to be used in the local context.

3) Specific skills are required in organizing and managing meetings effectively; these should not be neglected when designing and implementing a program and hiring and training staff.

4) Social scientists have played an important role in improving the use, design, and organization of meetings.

II. Experimenting with Methods to Improve Farmer Participation

Experimentation within Research Programs

The on-farm research programs in the case studies have experimented with various methods to bring farmers into the research process. For example, in Zambia it was concluded that four main methods are important:

1) farmer field days;

2) end-of-season meetings with farmers to review results;

3) comments by farmers during field visits of senior on-farm researchers;

4) farmers' day-to-day comments to trial assistants.

In Zimbabwe, the Farming Systems Research Unit and the extension service, AGRITEX, have emphasized three activities for strengthening farmer participation in research:

1) using existing farmer groups or the local administrative structures, the Village Development Committees, to organize meetings and field days to analyze farmers' problems and priorities as well as to screen trial plans and to discuss results;

2) awarding prizes to individual farmers and farmer groups for best trial management;

3) leaving equipment used in trial work with farmers all year and encouraging them to experiment with it on their own.

The Bangladesh Agricultural Research Institute has been developing new methods and techniques for collecting and analyzing data at the household and village levels (Gupta, 1987). Since 1982 they have been experimenting with various types of "Innovative Farmer Workshops." These are one- to two-day workshops focused on specific crops or research problems. They are small, involving five to ten innovative farmers and 25 to 35 researchers and extensionists. Farmers give presentations and practical demonstrations on their experiments and innovations, and scientists and farmers exchange ideas on how to make further technological improvements (Abedin, 1987). The outcome is a series of specific recommendations for further research, both on-farm and on experiment stations, and extension activities. There have also been proposals to establish regular meetings with groups from different socioeconomic levels, including landless laborers, to advise the research teams.

Efforts to institutionalize new methods of farmer interaction in Guatemala have declined since the development of the *sondeo* in the 1970s, but a few scientists have continued to experiment in this area. For example, some scientists in the Animal Production Program have discussed alternative technologies with farmers before beginning experiments, and a scientist in the Bean Program is experimenting with methods of involving farmers in selecting materials.

Since the methodology was set, the Caisan Project in Panama has not developed institutional innovations for farmer participation. The Dual-Purpose Livestock Project in Panama, however, has maintained more flexibility. An implication for research managers is that local researchers, given sufficient flexibility and control, are able to develop innovations, but a policy commitment to encourage such initiatives is necessary if they are to be institutionalized.

National Coordinating Committees or Technical Panels

To promote the development of techniques and methods for farmer participation, some senior agricultural research policymakers have established a national on-farm research coordinating committee. A key feature of committees in Senegal and Nepal has been the development of methods for on-farm, client-oriented, research. They have provided

a forum for sharing experiences and the synthesis of ways to facilitate farmer participation. Resources are being allocated to this type of information exchange, and each committee is being tailored to the specific characteristics of the national institutional setting.

In Nepal, when the Cropping Systems Project was taken out of the Agronomy Division and made into a division of its own (FSR&DD), a number of national-level technical research panels were created to facilitate exchange of information across divisions and research stations. One of these was for farming systems research. Under its auspices, researchers from different on-farm research programs share experiences and lessons. Through these discussions, the group treks used in the national on-farm research programs have drawn upon earlier independent experimentation in PAC and LAC (Galt & Mathema, 1986). There have also been other cross-institutional working groups on such topics as cost-effective farmer monitoring surveys, and the design and management of on-farm trials (SERED, 1987).

What is important here is that there are independent farming systems units carrying out OFCOR, and the national program has provided the opportunity for the cross-fertilization of ideas and methods and has facilitated innovation.

National institutions, such as committees, research panels, and working groups are also being developed in Zimbabwe, Zambia, and Bangladesh.

It is important to note, however, that a national institution established to encourage experimentation and share experiences is very different from that established to control and direct the programs under its authority. A continuous conflict with coordinating national institutions of this type is between groups who want to use the institutional structure for control and those who want to use it for learning and synthesis. For example, at one of the early national seminars on farming systems research, called by the Bangladesh Agricultural Research Council, some participants thought that the meeting was (or should have been) held in order that their specific methodology for on-farm research be adopted by all institutions in the country. Others felt that it should be used to share experiences and synthesize lessons.

The conflicts between competing groups of scientists, and often a desire on the part of one group to have it seen that other groups are adopting what they developed, is one of the major problems a research manager has to address when seeking ways to encourage innovative institutional behavior and the exchange of information and experience.[17]

III. Meetings with Farmers

Types of Meetings

Various types of meetings with farmers have been used in the case study programs. Table 3 shows the broad range of meetings found in the case studies and lists five major types of meetings of scientists and resource-poor farmers at village and household levels. These are:

1) group tours (exploratory and regular);

2) village meetings;

3) different types of field days;

4) individual farmer meetings;

5) special research meetings.

In the table, meetings are grouped according to where they take place and their major purpose. The group tours take place at the regional and research area level, while village meetings take place at the community and village level. Field days are usually held to discuss results of trials. Individual meetings take place on a one-to-one basis between farmers, and different members of village households. Special research meetings may take place in any location, depending on their purpose. Sometimes these have been in the field and sometimes they have been held at administrative centers or experiment stations.

The emphasis given to different types of meetings varies across the case studies. Major attention has been given to:

- exploratory group tours;
- general village meetings;
- village meetings to select farmers for trials;
- field days for extension and demonstration purposes;
- formal household and farmer case studies.

Medium and minor attention has been given to:

- regular group tours;
- village meetings to discuss program design;
- village meetings on implications analysis;
- research field days;
- political and community support field days;
- informal meetings with farmers and other household members;
- special research meetings.

17. At the international level, there are institutions with networking and coordinating roles which have to address some of the same problems and manage the pressures of interest groups.

Table 3: Types of meetings in on-farm research

Meeting	Major purpose and emphasis	Location	Major participants	Examples
GROUP TOURS a) Exploratory	To interview farmers, extension agents, etc., to decide on major priorities for OFCOR program	Areas to be covered by OFCOR	Senior and junior natural and social scientists, extension staff, farmers	(Most programs had some form of diagnostic or formal surveys at the start) (PIP, Ecuador; Caisan, Panama; Senegal; AI and FSRU, Zimbabwe; Zambia; Indonesia; Guatemala)
b) Regular	To discuss current research program with farmers, junior field staff, and assess priorities of the OFCOR program	Tours in selected areas of research zones	Senior and junior natural and social scientists, field technicians, field extension staff, farmers	Combined trek (LAC, Nepal), group trek (PAC, Nepal), joint trek (FSR and DD, Nepal)
VILLAGE MEETINGS a) General	To discuss program design, implementation and results. Also to get community support for the program		Farmers, OFCOR personnel, extension staff, village and community representatives	DRI-PIP, Ecuador; Caisan, Panama; Djibelor team, Senegal Zambia; Bangladesh. Group meetings of landless laborers and farmers from different resource base strata, Bangladesh landless laborer and resource-poor farmer advisory group, Bangladesh.
b) Program design	To get farmers views on the relevance and utility of proposed OFCOR program of trials, surveys and meetings	Village, or community level	Farmers, extension staff (sometimes), OFCOR staff	Group dialogue meetings (Fleuve team, Senegal); farmer development groups (Ecuador, PIP-DRI affiliated; Small Ruminant CRSP, Indonesia)
c) Program implementation	Generally used to select farmers for trials		OFCOR staff, extension staff (sometimes), farmers, village representatives	PIP, Ecuador; FSRU and AI, Zimbabwe; early programs in Luapula and Central Province, ARPT, Zambia. Regular meetings with farmer collaborators; (CLSR, UACP and Small Ruminant CRSP, Indonesia)
d) Implications analysis and interpretation	To get farmers' views and advice on how to interpret and use information from trials and surveys for future extension, OFCOR programs and experiment station research		Senior and junior OFCOR staff, farmers	End-of-season meetings (Luapula, Zambia); Bimonthly meetings (Small Ruminant CRSP, Indonesia)

Table 3: Types of meetings in on-farm research (continued)

Meeting	Major purpose and emphasis	Location	Major participants	Examples
FIELD DAYS a) Extension	To demonstrate, and get farmers' reactions to new technology	Farmers' fields	Farmers with trials, extension staff, other farmers	Farmer observation tour; (Salcedo, PIP, Ecuador; Caisan, Panama; Bangladesh; Zimbabwe). 2nd stage farmer field days (Luapula, Zambia; CLSR, Indonesia)
b) Research	To get the assessment of farmers on the relevance, progress and outcomes of trials.	Farmers' fields looking at trials and experiments	Farmers with trials, OFCOR staff. .	Internal field days (FSRU) Zimbabwe. 1st stage field days (Luapula, Zambia)
c) Political and administrative	To strengthen local and national support and resources for agricultural research, including OFCOR	Research zones	Farmers, extension staff, local community leaders, local and national political figures	2nd stage field days (Luapula, Zambia) FSRU, Zimbabwe.
INDIVIDUAL HOUSEHOLD AND ONE-TO-ONE MEETINGS a) Formal	To record trial and survey information. Log books and questionnaires often used	Farmers' fields and households	Farmers with trials, selected 'control' farmers without trials, selected case study households, OFCOR staff (and some extension staff) and farmers as respondents in a survey.	Regular monitoring and planning visits (Dual Purpose Livestock, Panama); farmers selected by community perspective method Zambia; regular monitoring and planning meetings (MARIF OFR, Indonesia); household case studies Bangladesh, Indonesia); 30 farmers monitored from 5 resource-based strata (Small Ruminant CRSP, Indonesia)
b) Informal	To improve relevance and quality of formal data collection methods; to gain ideas for the interpretation and analysis of data collected by formal methods	Village, household, in the field.	OFCOR staff who live at the research site, and farmers and others who live in the village.	Logbooks (PIPs, Ecuador; Bangladesh, Zambia) trial record book (CBI, CRI, FSRU, Zimbabwe)
SPECIAL PURPOSE RESEARCH MEETINGS	For senior scientists and research farmers to discuss specific research and diffusion topics	Where appropriate, e.g., village, local office, research station	Selected senior and junior OFCOR staff, experienced extension staff and farmer experimentors (informal R&D experimentors)	Farmer / researcher agronomy meeting (Guatemala); Farmer / researcher structured animal science meetings (Guatemala); innovator farmers' workshops and progressive farmers' workshops (Bangladesh)

As already stated, aims and purposes of meetings with farmers have to be clearly set out. To some extent the composition of meetings reflects the approach towards farmer participation which underlies the program. For example, several programs have found that they were having to organize one type of field day for extension and political purposes and a separate field day, with different participants, for a research dialogue.

Group Tours

Group tours are organized for scientists to visit a target region. The objective is to talk to farmers and other people in villages to diagnose problems and to draw up on on-farm research agenda. A typical example is the sondeo in Guatemala (Hildebrand and Ruano, 1982). Some recent examples are the joint, combined, and group treks in Nepal. Rapid rural appraisals, and informal, diagnostic, reconnaissance, exploratory and key informant surveys are others. These tours share the following key features:

- use of unstructured interview techniques;
- groups of senior scientists of different disciplines travelling and staying together in rural areas;
- use of checklists to help ensure that major topics are not omitted;
- the idea that other methods of data collection and interpretation (e.g., trials, surveys, and other types of meetings and communication methods) would subsequently be used to collect, interpret, and transmit information for which the group tour was not designed.

The concept of group tours is not new, and there is a long tradition of precedents in crop improvement programs. In Nepal, for example, from 1967 to 1972, senior scientists from the central station regularly went on tour to visit government farms and research stations. When the commodity programs started farmer field trials in 1973, scientists included visits to these on-farm trials in the tours.

The main features of these tours were:

1) The purpose of the visits was to evaluate the performance of technology under local conditions. While there was some interaction with farmers, it was not a key objective.
2) Emphasis was on the collection and interpretation of agroclimatic rather than socio-economic information, and social scientists were not included. The collection and interpretation of socioeconomic information about farmers and village level socio-economic conditions differentiates on-farm research group tours from their precursors in technology generation and extension programs.
3) They generally emphasized the testing of technology under different natural resource conditions. Problem diagnosis, feedback, and priority-setting for research stations are the new features of interdisciplinary group tours which have been developed as part of on-farm, client-oriented, research programs.

Two types of group tours were distinguished in the cases reviewed: the exploratory tour and the regular tour. The two are not mutually exclusive. However, a program with regular tours is placing a different emphasis on the way it is having farmers participate in the research. Exploratory and diagnostic surveys are examples of initial tours, like the *sondeo*, which takes place only once. The same approach has been followed in setting up the programs in Senegal, Zambia, and the FSRU in Zimbabwe. In contrast, regular group tours in PAC and LAC in Nepal have been organized regularly once or twice a year. The original Cropping Systems Project used the single initial tour approach as outlined in the IRRI methodology but started to hold regular tours when the program was reorganized into the FSR&DD in the mid-1980s.

An important feature of these tours is that they combine meetings with groups of farmers and village leaders with meetings with separate groups of women and men. In addition, the researchers have meetings in the village with individual farmers and extension staff. In this way information from different sources can be checked and interpreted. During the week-long visit, tentative diagnoses of problems and research agendas formulated near the beginning of the visit are revised.

A PAC staff member noted that it is essential for the team to have an explicit objective to come up with a research program by the end of the week. Otherwise the tour takes on the characteristics of a casual visit, and the hard work of arguing over the diagnosis of problems and priorities is avoided (Pandey et al., 1986).

In Bangladesh, BARI, which also used the IRRI cropping systems methodology, runs group tours for scientists but has not institutionalized them as part of planning research programs. In Zimbabwe, the Committee for On-Farm Research and Extension Planning organized monitoring tours by staff and extension workers to the communal areas. The emphasis was on talking to the staff of on-farm projects, rather than directly with farmers. This example highlights the need to carefully identify the aims and content of tours and meetings if they are to encourage farmer participation.

The initial group tours are a feature of the consultative mode of participation. Regular tours are collaborative. Their major feature is the direct ongoing contact between scientists and farmers in their production environments. They contribute to the continuous review and assessment of both on-farm and on-station research. These tours have special resource and management requirements. Accommodation has to be organized and transport and resources for per diems and other costs arranged. Senior staff feel the

pressure of other obligations and in some cases, believe that the time on such activities is not usefully spent, because there is little new to be learned.

This is a crucial issue. Senior scientists at LAC in Nepal have argued that their attendance on regular tours is not necessary but that monitoring surveys conducted by social scientists or technicians would be an adequate alternative. Nevertheless, the research manager at LAC, who originated the regular tours, argued that the attendance of senior staff is essential.

For a research manager, the critical decision is whether regular direct contact between farmers and senior staff during the tour results in better research plans and better use of resources. From the increase of this type of tour, it appears that some research managers feel it is worthwhile.[18] One advantage of the regular tour is that it reduces the chances that on-station research may be out of line with the technical and socioeconomic conditions of the clients.

Village Meetings

One major purpose of group tours is to assess the relevance of current research to the overall problems of resource-poor farmers in a region. Village meetings are primarily concerned with the participation of farmers in research planning and implementation at village and community levels. They can be held for a number of reasons: to select farmers, to discuss the design and implementation of the program, and to interpret the data from trials and surveys.

It was generally found that using meetings as a way of selecting farmers had problems: it often resulted in bias, trials tended to be scattered, control over research was sometimes lost, and research sometimes came to be dominated by the wealthier farmers. In Luapula Province in Zambia, group meetings in which the community would select farmer cooperators, as well as those meetings in which extension workers guided the choice of cooperators, both resulted in a bias towards the selection of "progressive" farmers. In Indonesia in the Upland Agricultural and Conservation Project, however, village meetings and the participation of village leaders were important for selecting and encouraging farmers to take part in the research.

Village meetings are used to design trials in a number of cases: the Fleuve team in Senegal has used meetings with farmers, extensionists, and researchers to decide on the content of some trials, which they call "dialogue trials" because the trial is defined through dialogue with farmers. In the Small Ruminant Project in Indonesia, sites were chosen so that research station staff could regularly visit the villages, and farmer participation through group village meetings is a major feature of the program. Regular monthly meetings in the villages include the staff from the local research station and are used to discuss problems facing farmers, and what technology might be available for addressing those problems. There are also regular half-yearly evaluations of the program based on the farmers' assessment of the direction of the research. Few cases of farmer participation in village meetings as a method for interpreting information were evident, though there were situations in which the researchers had written a draft report of their findings and then asked farmers at a village meeting whether they agreed with them. In the Luapula ARPT, Zambia, end-of-season meetings are designed for research purposes. The bimonthly meetings of the Small Ruminant Project in Indonesia place emphasis on using these meetings to assess results and replan the program. The group treks in Nepal are also a type of village meeting in which the research program is discussed with farmers before it is finalized. In many situations researchers say they take farmers' opinions into account, but how this is done and what weight is given to them remains vague.

It was found in Nepal, Senegal, Zambia, Zimbabwe, and some programs in Indonesia that considerable care is given to the organization and management of group and village meetings in the social and political context of village life, since the way they were organized directly affects who participates in what decisions. The results of surveys, such as those conducted in the ARPT in Zambia, showed that village meetings which were not carefully designed and conducted led to domination of the program by resource-rich farmers, and the program was seen as a source of seeds, fertilizer, or other inputs, rather than as a research program.

A key lesson for managers is that poorly organized and managed meetings can be particularly discriminatory against the participation of women. The language of the meeting, the place where it is held, the distance from home, the duration and actual seating arrangements, can all serve to prevent women from participating. These are some of the issues which are being addressed in the group treks in Nepal, where careful arrangements are being made for specific types of meetings with resource-poor women.

BARI is planning to take some of these issues into account by introducing separate evening meetings with a) cooperators in the previous year's trials, b) noncooperating, poor and tenant farmers, and c) noncooperating rich farmers. They also plan to set up an advisory group of landless laborers to advise the team.

Different Types of Field Days

Field days for extension purposes and for the discussion of technology have been a major feature of most on-farm research programs, especially those that have used a consultative mode of participation. In Guatemala and Ecuador

18. For further discussion on this topic, see Merrill-Sands and McAllister (1988).

they were an important mechanism to get scientists away from research stations for direct talks with farmers; this had previously been the job of extension workers. In Panama, field days with discussions in the local language was an important innovation. Previously, experiment station researchers held field days in which they presented their findings in technical language and there had been minimal dialogue with farmers.

As with village meetings, researchers have found that great care is needed in organizing field days. There are many functions for which these days can be used, and trying to achieve all of them in the same event is not possible. Other reasons for having field days for different purposes are that:

- scientists found they could not have a good dialogue with farmers during an extension field day;
- it was recognized (e.g., in Zambia) that some farmers and junior staff felt intimidated or were reluctant for other reasons to express their true feelings about the research when senior people, or "outsiders," were present.

Three types of field days are seen in a number of programs:

1) field days for political and administrative purposes;
2) extension field days;
3) research field days.

Field days for political and administrative purposes. To obtain local and national support for on-farm research, careful attention has to be given to political and administrative considerations. In Zimbabwe and Zambia, local political parties are increasingly being involved explicitly and systematically in field days and other parts of the research. In programs funded by international agencies, field days or other field visits are sometimes necessary for maintaining financial support. Political and financial support considerations are very important for research managers, and local managers are increasingly finding ways of organizing their programs so that these different and sometimes conflicting reasons for field days are systematically addressed.

Extension field days. Primarily designed to show farmers and extension workers the results of on-farm research, normally in the form of higher crop yields or more cost-effective practices, these field days may center on a single technical theme, as in Ecuador, or to be more general, as in Zambia.

There are differences between programs in the degree to which extension services are involved: in Pakhribas and Lumle Agricultural Centres in Nepal there is total integration of the research and extension systems as staff of the same institution organizes both programs. Zimbabwe is a good example of where all on-farm research involves the main extension service, AGRITEX, so extension workers are closely involved in field days. These have been taken one stage further, and extension field days generally include political leaders and development agency staff as guest speakers. For example, the Agronomy Institute invites officers from the National Farmers Association of Zimbabwe, and the Farming Systems Research Unit invites senior ministry officials and provincial governors. Some events attract large numbers of farmers, and on-farm research gains substantial political recognition.

In PIP in Ecuador, the team associated with a development project in the Salcedo area have developed an important way of involving farmers with trials in extension activities: they have a farmer observation tour during which cooperating farmers visit all the trials in the area and explain the results to other farmers at each location.

Research field days. Some of the case-study on-farm research programs–Luapula Province in Zambia and the Farming Systems Research Unit in Zimbabwe–organized field days specifically for research purposes.

In Luapula Province, emphasis has been on finding or creating an environment where farmers feel free to make comments on aspects of the program. The two principal methods used are

1) field days organized especially for farmers;
2) small end-of-season meetings with cooperating farmers to review trial results.

Farmer field days are organized in two stages: during the first, field days are held within each cluster of trial sites for the trial farmers in each cluster and the neighboring farmers. The trial assistants and local extension workers make the arrangements, but the trial farmers explain the trials themselves and take the lead during discussions. Only if there are questions which the farmers cannot answer do the agronomist or trial assistants intervene.

The second stage is a larger meeting involving local leaders and bringing together all farmers from the clusters. The meeting is held in a local primary school, and its purpose is to encourage farmers to voice opinions about the trials and to suggest how they could be improved. The local extension worker makes a record of the meeting, meaning that the findings and farmers' assessments are fed directly into local extension work as well as into the research program. Although it takes more time to organize two types of meeting, the team has found that farmer participation is high, and they are able to obtain farmers' advice effectively.

The end-of-season meetings with farmers, chaired by the extension block supervisor, are organized by the technical assistants who present the results of the trials, which are written up as handouts in both English and Chibemba. The ARPT scientists attend but only intervene when called on

by the technical assistants to do so. The scientists have found these meetings useful, as they are held at a time when they have been discussing trial proposals for the forthcoming year.

In Zimbabwe, the Farming Systems Research Unit distinguished between "internal" and "external" field days. Internal field days were for cooperating farmers and researchers only, and the external ones were for extension and political purposes.

Individual Meetings with Farmers

An inherent problem for on-farm programs is how to capture and use the information which comes from direct contact with farmers. This type of meeting may be divided into formal and informal.

Formal meetings. With these meetings farmers are selected for regular monitoring activities, and specified sets of information are regularly collected. Some programs are working with a limited number of research-minded farmers, with whom they have considerable contact. In the Dual-Purpose Livestock Project in Panama, and the Maize On-Farm Program in Indonesia, the information is used as it is collected, to monitor and replan the research program. Several other projects, as in Nepal, Bangladesh, and Indonesia, which have been associated with the Asian Farming Systems Network, have household case studies, with intensive ongoing monitoring of a wide range of socioeconomic information. However, while this type of work involves contact with farmers, it can become a data collection exercise, with the information collected having little impact on the progress of the actual research program.

Informal meetings. These take place as part of the ongoing research. In Zambia, comments by farmers to the senior agronomist on visits to the trials are seen as an important source of information. The face-to-face discussion with individual farmers who have trials enables the scientist to discuss and explore issues relating to the trial and research programs, which do not come out in formal farmer/scientist or group meetings.

It is also recognized that assistants who are responsible for the day-to-day activities relating to the trials in their area obtain important information on these and other matters from their daily contact with farmers. The frequency and quality of their contact is high, since they live in the same area and have become part of the local community. The team have tried to get the technicians to write farmers' comments up in logbooks, but this has been difficult. They are still trying to find viable ways to capture and synthesize this information.

These sentiments from Zambia are reflected in many programs. Logbooks and trial record books have been tried in Ecuador, Bangladesh, and Zimbabwe. Sometimes great care has been put into designing logbooks, as in Ecuador, and field staff have been assiduous in filling them in. The challenge is how to introduce a management method which can systematically review and assess, in a timely way, the relevance of this information for different research and extension purposes. It was found, for example, that there were well-documented cases of new technologies arising from informal R&D by farmers, but the information was not used in the research program.

In conclusion, it is argued that the increasing attention now being given in some on-farm client-oriented research programs to the careful design of meetings, which include field-level staff and farmers, is a method which innovative research managers are using to capture and synthesize farm-level information in a systematic and timely way for planning of research and extension programs. Meetings are being seen as an alternative method to such things as log books and formal surveys for the collection and interpretation of certain types of information. As with any research tool, however, to be effective, meetings must be carefully designed, managed, and the outcome carefully analyzed.

Special Research Meetings

In a number of programs, meetings have been organized between scientists and farmers to discuss particular issues. In Bangladesh the on-farm research program arranged innovator workshops for mustard and potatoes. The purpose of the potato workshop was to ask the advice of local growers on how best to grow the crop under different and very variable conditions. It was found that farmers had methods of increasing yields by taking some tubers from the plants early in the season. This practice was not previously familiar to the scientists. In the Farming Systems Research Unit in Zimbabwe, a similar type of meeting is evolving.

In Guatemala two kinds of special meetings have been tried but not institutionalized in the ICTA programs:

1) meetings (*encuentros agrícolas*) between farmers and researchers have been organized on particular technical problems;

2) the new animal science unit is experimenting with structured meetings (*confrontaciones*) as a tool for diagnosing farmers' problems and priorities.

In the Dual-Purpose Livestock Project in Panama, there is a general commitment to the collaborative mode of interaction with farmers; many of the meetings can therefore be seen as research meetings. Such meetings with individual or small groups of research-minded farmers are based on selectively identifying farmers with knowledge of local practices who are interested in formal and informal research.

Lessons for Research Managers

Design and content of meetings. A number of different types of meetings at the village and household level have been discussed in order to bring out why it is important for research managers to differentiate between meetings for very different purposes. Arranging and participating in meetings with farmers and other people at the village level takes time and resources that might be used for other purposes. Some on-farm programs are finding that the careful use of meetings to promote different types of farmer participation for different purposes are complementary to other methods of data collection and analysis such as trials and surveys. Many programs are recognizing this and are increasing the proportion of resources allocated to this activity. The result is a more cost-effective use of resources in the overall on-farm research program.

It is important to note, though, that as much care needs to go into the design and management of meetings as is necessary for the design and implementation of "good" programs of trials and surveys. The increased use of selective and carefully designed meetings represents an alternative to a program in which the emphasis is on allocating most resources to trials and formal surveys.

Critical features of successful meetings. Three key lessons on the organization of meetings are coming out of the OFCOR experiences studied.

First, the purpose of the meeting has to be clearly defined from the start. There are many (and sometimes conflicting) reasons why a program organizes meetings with different people at the village level. As much care needs to go into the planning of these meetings as into the planning of trials and surveys. Table 3 lists examples of meetings found in the case studies.

Second, once the purpose of a meeting has been established, the team must decide how to organize the involvement of the desired participants. In each on-farm situation this will be a location-specific activity and will require the initiative of the local team. This activity has to be organized locally because each team will find themselves in a unique local political and institutional setting. Each area will have its own history of previous researchers, extension programs, and government personnel. And the team will have its own mixture of staff and resources. All of these factors will directly affect how a team organizes meetings with farmers.

And, third, the timing of meetings and timely reporting of results are important if the information is to be relevant for research planning.

Participation of scientists in village meetings. A realistic target should be set for the allocation of senior scientists' time for meetings with farmers and the necessary resources and rewards provided for achieving them. In Nepal, a blanket decree that all scientists in the research system should spend 40% of their time in on-farm activities proved unrealistic. In contrast, the Director of LAC in Nepal was able to set realistic targets for meetings with farmers and was able to provide the necessary resources and incentives.

The role of social scientists. It appears that the programs that have gone a considerable way in systematically considering how to organize meetings for different purposes are the ones in which rural sociologists and anthropologists have been involved. Although ideas come from many places, and the biological researchers are one of the major sources, rural sociologists are more likely to be aware of the organizational and managerial aspects of involving farmers in research. Their skills complement the other disciplines in a research program, and the presence of social scientists in research teams can very often catalyze the development of new research of methods. In Zambia, where there has been careful work on developing different types of meetings, the rural sociologist was given a specific task. Part of this was to identify problems of farmer participation in research and help develop viable methods for improving it (Sutherland, 1988).

CHAPTER 4
LESSONS AND IMPLICATIONS FOR RESEARCH MANAGERS

All the OFCOR programs in the case studies identified resource-poor farmers as their principal clients and developed a range of methods for the generation and transfer of technology appropriate to their needs.

Farmers participated directly in the process in various ways, and a variety of innovative methods and structures to facilitate this process were developed. The specific context within which this took place varied tremendously. Each manager worked within the unique structure of his or her institution.

No blanket recommendations for ways to support farmer participation can be advocated. Managers must identify constraints and opportunities and determine where there is room to maneuver. The following lessons from the case studies focus on major issues common to many situations.

I. Policy Commitment to Resource-Poor Farmers

National Development Policy

In the case studies, it was found that a national policy commitment to resource-poor farmers is a prerequisite for maintaining the reliable funding and administrative support upon which an active OFCOR program depends. Activities that encourage farmer participation in the research process are often the first to be cut back in periods of austerity.

Agricultural Research Policy

Research systems often have not rewarded scientists for working directly with resource-poor farmers. Even in programs committed to clearly defined clients, two types of issues have impeded the sustained development of mechanisms which bring researchers and farmers together in research. The first are the inadequate availability of vehicles, travel allowances, and other operating resources. The second are the lack of recognition for on-farm activities in promotion decisions and in other rewards, including professional status. Reward structures in public institutions are often inflexible. To mobilize sustained support for farmer participation, these rewards and promotion incentives must be changed. In the short run, however, research managers must find resources and incentives to encourage scientists to continue working with farmers.

In the case studies, the OFCOR programs placing emphasis on the participation of farmers have been the ones with a high proportion of social scientists in the field. Of particular importance are the instances where social scientists have actively investigated ways to improve the criteria for selecting farmers and involving them in research. Research managers took on new staff and/or directed social scientists to look at these issues. This represented a shift in research policy to reallocate the necessary funds.

II. Four Modes of Participation: The Need for Flexible Approaches

This study has classified the on-farm, client-oriented research efforts studied according to four modes of farmer participation:

Contract mode:	scientists contract with farmers to provide land or services;
Consultative mode:	scientists consult farmers about their problems and then develop solutions for them, like a physician and his/her patients;
Collaborative mode:	scientists and farmers collaborate as partners in the research process;
Collegial mode:	scientists strengthen farmers' capacity for informal research and development.

The modes should not be seen as "stages," but they do represent significantly different attitudes to what farmers can offer scientists. The difference between the *contract* and *consultative* modes is that in the latter farmers are respected as an important source of information about local conditions and agronomic practices. The difference between the *consultative* and *collaborative* modes is that in the latter farmers interact continuously in the research process. The difference between the *collaborative* and *collegial* modes is that in the latter researchers respect and endeavor to strengthen farmers' independent, informal capacity to define research problems and organize strategies for solving them.

Most of the programs in the case studies have worked within the consultative and collaborative modes. Most started with methodologies which limit the participation of farmers to set roles–the consultative mode. With experience, a number of them have developed flexible methods which involve farmers as partners in various ways–they have moved closer to the collaborative mode. They have found these methods to be cost-effective.

Each mode implies different operations and procedures. It is important for research managers to decide what the major emphasis of their program should be at a given time and design it accordingly. One of the problems in the past has been a lack of clear differentiation between on-farm research being conducted for different purposes. A program operating under the consultative mode must be organized and managed quite differently from one that emphasizes involving farmers at multiple levels of decision-making, within the collaborative mode.

If a program shifts its emphasis from the consultative to the collaborative mode, the manager must meet a series of challenges. Both senior and junior scientists must allocate more time to on-farm work, and new staff may need to be hired. Different types of meetings with farmers must be organized. New procedures for the collection and analysis of data must be arranged. Researchers must be involved in critical evaluations of their methods and procedures, which will alter their attitudes towards the utility of working with farmers. The need to maintain flexibility of this kind should not be underestimated.

III. Strengthening Informal Research and Development through Collegial Participation

Although none of the case studies included programs that worked primarily within the collegial mode, some researchers have provided resources to research-minded farmers to help them experiment independently. Various ways to encourage and support informal research and development by farmers have been documented in recent literature (Farrington, 1988; Pacey et al., forthcoming). There is significant potential for supporting a wide range of activities in this mode of participation.

Support for informal research and development by farmers can be justified on a number of grounds. It can shift some of the costs of research from the formal institutions to farmers. This can help address the chronic logistical problems that institutions have encountered in maintaining research sites in isolated areas, including the turnover of junior staff. Developing continuous contacts with research minded farmers can pay off in various ways. They will remember past research results, and interpret and adapt them in the light of changing local conditions. They will look to the formal research system for new technology to test. Informal R&D has always been an important source of technological innovations; what is being advocated here is a systematic way to strengthen and capitalize on this research capacity.

IV. Meetings of Researchers with Farmers: An Important Tool in On-Farm Research

Many research managers think that on-farm research consists primarily of surveys and trials. In the case studies, meetings with farmers played important roles at various points in the research process. They have been classified into the following types:

- initial group tours;
- regular group tours;
- village meetings;
- various types of field days;
- individual meetings with farmers;
- special research meetings.

Programs in the collaborative mode have placed considerable emphasis on the design and management of meetings. Meetings have been used as a way to select farmers, as an alternative to surveys for collecting certain types of data, to plan programs of experiments and to implement them efficiently, and to communicate the results of research. The case studies have demonstrated that greater attention must be given to the purposes of meetings, and to the best ways to organize them. The local power structure often has significant impact on the way people participate in meetings. Great care must be given to organizing meetings so that the people the program wants to reach are present and are in a position to speak openly. It was found that meetings with farmers for research purposes must often be held separately from meetings for extension and other purposes. All of these factors are very specific to local circumstances: managers must be very careful not to propose uniform protocols, schedules, and formats for meetings.

V. Strengthening Links with Other Institutions at the Village Level

On-farm research at the village level is a difficult and challenging enterprise. Established research methodologies provide little guidance on how to interact with a range of local people and other outsiders. In some situations, other institutions are active in the same locales, which can lead to conflicts. Development projects may provide free inputs, rais-

ing expectations among farmers that researchers will provide the same services. These are very common problems.

On the other hand, collaboration between agencies working in the same villages can be an effective strategy. Voluntary and nongovernmental organizations (NGOs) often have developed close, ongoing relationships with resource-poor farmers, and often have flexible management systems. There is much room for productive partnership, if research managers dedicate time to finding ways to develop it.

VI. Learning from On-Farm Research Practitioners

One of the most important findings from this study is that research practitioners have been innovative and have developed a wide variety of mechanisms to involve farmers in the research process. They have been strongly committed to working with resource-poor farmers. And, one way or another, they have found the necessary resources. They have taken flexible approaches to their research, and their superiors have given them the latitude to experiment. They have often been open to ideas from outside and, when appropriate, they have selected components and adapted them to local circumstances. Support must be given to local researchers, and funds must be allocated for communicating experiences with farmer participation among researchers in different regions and in different countries.

REFERENCES

A. The Case Studies

These documents are being published by ISNAR and are available upon request.

Avila, M., E.E. Whingwiri, and B.C. Mombeshora. 1987. "Zimbabwe: A case study of five on-farm research programs in the Department of Research and Special Services, Ministry of Agriculture." The Hague: International Service for National Agricultural Research (ISNAR). *Draft.*

Budianto, J., I.G. Ismail, Sridodo, P. Sitorus, D.D. Tarigans, and A. Mulyadi, Suprat. 1988. "Indonesia: A case study on the organization and management of on-farm research in the Agency for Agricultural Research and Development, Ministry of Agriculture." The Hague: International Service for National Agricultural Research (ISNAR). *Draft.*

Cuellar, M. 1987. "Panama: Un estudio del caso de la organización y manejo del programa de investigación en finca de productores en el Instituto de Investigación Agropecuario de Panamá." The Hague: International Service for National Agricultural Research (ISNAR). *Draft.*

Faye, J., and J. Bingen. 1987. "Sénégal: Organisation et gestion de la recherche sur les systèmes de production, Institut Sénégalais de Recherches Agricoles." The Hague: International Service for National Agricultural Research (ISNAR). *Draft.*

Jabbar, M.A., and Md. Zainul Abedin. 1989. "Bangladesh: A Case Study of the Evolution and Significance of On-Farm and Farming Systems Research in the Bangladesh Agricultural Research Institute." OFCOR Case Study No. 3. The Hague: International Service for National Agricultural Research (ISNAR).

Kayastha, B.N., S.B. Mathema, and P. Rood. 1989. "Nepal: A Case Study of the Organization and Management of On-Farm Research." OFCOR Case Study No. 4. The Hague: International Service for National Agricultural Research (ISNAR).

Kean, S.A., and L.P. Singogo. 1988. "Zambia: A Case Study of Organization and Management of the Adaptive Research Planning Team (ARPT), Ministry of Agriculture and Water Development." OFCOR Case Study No. 1. The Hague: International Service for National Agricultural Research (ISNAR).

Ruano, S., and A. Fumigalli. 1988. Guatemala: Un estudio de caso de la organización y manejo de la Investigación en finca en el Instituto de Ciencia y Tecnología Agrícolas (ICTA). OFCOR Case Study No. 2. The Hague: International Service for National Agricultural Research (ISNAR).

Soliz, R., P. Espinosa, and V.H. Cardoso. 1987. "Ecuador: Un estudio de caso de la organización y manejo del programa de investigación en finca de productores (PIP) en el Instituto de Investigaciones Agropecuarios." The Hague: International Service for National Agricultural Research (ISNAR). *Draft.*

B. Other References

Abedin, Md. Zainul and Md. Fazlul Haque. 1987. "Learning from farmer innovator workshops: Experiences from Bangladesh." Paper presented at the workshop on "Farmers and Agricultural Research: Complementary Methods." Institute of Development Studies, University of Sussex, Brighton, UK, 27-31 July, 1987.

Agrawal, B.D., et al. 1978. *Maize on-farm research project 1978 report.* Pantnagar: G.P. Pant University of Agriculture and Technology.

Ashby, J. 1986. "Methodology for the participation of small farmers in the design of on-farm trials." *Agricultural Administration & Extension* 22: 1-19.

Ashby, J.A., C.A. Quiros, and Y.M. Rivera. 1987. *Farmer participation in on-farm varietal trials.* CIAT/IFCD Project Working Paper. Colombia: CIAT.

Baker, G., H.C. Knipscheer, J. de S. Neto. 1988. "The impact of regular research field hearings (RRFH) in on-farm trials in northeast Brazil." *Experimental Agriculture* 24: 281-288.

Biggs, S.D. 1980. "Informal R&D: The failure of farmers to adopt new technological packages entirely may be a sign of creativity rather than backwardness." *Ceres* 13: 23-26.

Biggs, S.D., and E.J. Clay. 1981. "Sources of innovations in agricultural technology." *World Development* 9: 321-336.

Bingen, R.J., and S. Poats. In preparation. "The development and management of human resources in on-farm client-oriented research (OFCOR): Lessons from nine case studies." The Hague: International Service for National Agricultural Research (ISNAR).

Box, L. 1987. *Experimenting cultivators: A methodology for adaptive agricultural research.* ODI Discussion Paper 23. London: Overseas Development Institute (ODI).

Byerlee, D. 1987. *Maintaining the momentum in post green revolution agriculture: A micro-level perspective from Asia.* MSU International Development Paper No. 10, East Lansing, Michigan: Michigan State University.

Centro Internacional de la Papa. 1981. "Farmers help scientists change research objectives." Circular IX(4).

Chambers, R. and J. Jiggins. 1987. "Agricultural research for resource-poor farmers: A parsimonious paradigm." *Agricultural Administration & Extension* 27: 35-52, 109-128.

Ewell, P. 1988. *Organization and management of field activities in on-farm research: A review of experience in nine countries.* OFCOR Comparative Study Paper No. 2. The Hague: International Service for National Agricultural Research (ISNAR).

Ewell, P. In preparation. *Linkages between on-farm research and extension in nine countries.* The Hague: International Service for National Agricultural Research (ISNAR).

Farrington, J. 1988. "Farmer participatory research: Editorial introduction." *Experimental Agriculture* 24: 269-279.

Farrington, J. and A. Martin. 1987. "Farmer participatory research: A review of concepts and practices." *Agricultural Administration & Extension* 29: 247-264.

Food and Agriculture Organization/Agricultural Projects Services (FAO/APROS). 1984. *Planning training manual. Edition II: District level.* Katmandu: Agricultural Projects Services Centre (APROS), Training Programme for Agricultural Planning at the District Level in Nepal.

Galt, D.L. and S.B. Mathema. 1986. *Farmer participation in farming systems research.* SERED Report No. 3. Nepal: Ministry of Agriculture, Socio-economic Research and Extension Division, Khumaltar.

Gamser, M.S. 1988. "Innovation, technical assistance, and development: The importance of technology users." *World Development* 16: 711-721.

Green, T. 1987. *Farmer-to-farmer seed exchange in the eastern hills of Nepal: The case of pokhreli masino rice.* PAC Working Paper No.10/87. Katmandu: Pakhribas Agricultural Centre, c/o British Cooperation Office, P.O.B. 106.

Gupta, A.K. 1987. "Organising and managing the poor client-oriented research system: Can the tail wag the dog?" Paper presented at the workshop on the organization and management of on-farm, client-oriented research, The Hague, International Service for National Agricultural Research (ISNAR).

Hildebrand, P.E., and S.A. Ruano. 1982. *The sondeo, a multidisciplinary methodology for farm description and analysis for ICTA.* Guatemala: Institute for Science and Agricultural Technology (ICTA).

Kean, S.A. 1988. "Developing a partnership between farmers and scientists: The example of Zambia's adaptive research planning team." *Experimental Agriculture* 24: 289-299.

Kenmore, P.E. 1986. "Crop loss assessment in a practical integrated pest control program for tropical Asian rice." Pages 225-241 in P.S. Teng (ed.), *Crop loss assessment and pest management.* St. Paul, Minneapolis: American Phytopathology Society.

Lightfoot, C., O. de Guia Jr, and F. Ocado. 1988. "A participatory method for systems-problem research rehabilitating marginal uplands in the Philippines." *Experimental Agriculture* 24: 301-309.

Martin, A. and J. Farrington. 1987. *Abstracts of recent field experience with farmer-participatory research.* ODI Network Paper No.22. London: Overseas Development Institute (ODI).

Maurya, D.M., A. Bottrall, and J. Farrington. 1988. "Improved livelihoods, genetic diversity and farmer participation: A strategy for rice breeding in rainfed areas of India." *Experimental Agriculture* 24: 311-320.

Merrill-Sands, D., and J. McAllister. 1988. *Strengthening the integration of on-farm client-oriented research and experiment station research in national agricultural research systems (NARS): Management lessons from nine country case studies.* OFCOR Comparative Study Paper No. 1. The Hague: International Service for National Agricultural Research (ISNAR).

Norman, D., D. Baker, G. Heinrich, and F. Worman. 1988. "Technology development and farmers' groups: Experiences from Botswana." *Experimental Agriculture* 24: 321-331.

Pacey, A., R. Chambers, and L. Thrupp. 1989. *Farmer innovation and agricultural research.* London: IT Publications.

Pandey, M.P., K.P. Oli, and T. Green. 1986. "Initial approaches to FSR at Pakhribas Agricultural Centre." Discussion paper presented at the Farming Systems Working Group, 11-13 August, Pokhara, Nepal, August 1986.

Rhoades, R.E. 1987. *Farmers and experimentation.* ODI Discussion Paper No. 21. London: Overseas Development Institute (ODI).

Richards, P. 1985. *Indigenous agricultural revolution.* London: Hutchinson.

Sands, M. 1987. "Calf management in dual-purpose cattle systems: An example of coordinated on-station and on-farm research." IDIAP. mimeo.

Socio-Economic Research and Extension Division (SERED), 1987. *Papers presented at the workshop on trial design for on-farm research in Nepal.* SERED Report No. 9. Katmandu: Ministry of Agriculture, Socio-Economic Research and Extension Division.

Stavis, B. 1979. *Agricultural extension for small farmers.* MSU Rural Development Working Paper No. 3. East Lansing, Michigan: Michigan State University.

Sumberg, J. and C. Okali. 1988. "Farmers, on-farm research and the development of new technology." *Experimental Agriculture* 24: 333-342.

Sutherland, A.J. 1986. "Managing bias: Farmer selection during on-farm research." *Farming Systems Newsletter* (CIMMYT East Africa Economics Program, Nairobi) No. 26: 3-4.

Sutherland, A.J. 1987. *Sociology in farming systems research.* AAU Occasional Paper No. 6. London: Overseas Development Institute (ODI).

Sutherland, A. J. 1988. "Managing farmer selection for more effective FSR/E." Paper presented at the 1988 Farming Systems Research/Extension Symposium. University of Arkansas, Fayetteville, Arkansas, 9-12 October 1988.

Thiele, G., P. Davies and J. Farrington. 1988. *Strength in diversity: Innovation in agricultural technology development in eastern Bolivia.* AAV Agricultural Administration (Research and Extension) Network. Network Paper 1. London: Overseas Development Institute (ODI).

Tripp, R. 1982. *Data collection, site selection and farmer participation in on-farm experimentation.* CIMMYT Economics Program Working Paper 82/1. Mexico: CIMMYT.

Tripp, R. In preparation. "Farmer participation in agricultural research: New directions or old problems?" Discussion Paper 256. Institute of Development Studies, University of Sussex.